

# Analysis $\mathcal{A}$ equationum

U N I V E R S A L I S

S E U

Ad  $\mathcal{A}$ EQUATIONES ALGEBRAICAS Resolvendas

METHODUS Generalis, et Expedita,

Ex nova Infinitarum serierum Doctrina

D E D U C T A

A C

D E M O N S T R A T A

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L O N D I N I,

Prostant venales apud *Abelem Swalle*, ad Insigne *Monocerotis*  
in *Cæmeterio Divi Pauli*. MDCXC.

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CLARISSIMO SPECTATISSIMOQUE

D O M I N O

Johanni Hoskyns,

MILITI & BARONETTO

Regiæ Societatis Vice-Præsidi

LONGE DIGNISSIMO.

*Spectatissime Domine,*

**N**Ominis tui, apud eruditos, non immeritus honor, singularis in Societatem Regiam benevolentia, singularis Eruditio, animum, Cui hæc mea dicarem qualiacunq;, haudquaquam diu suspensum tenuerunt.

Patro-

Patrocinium veritati, non aliunde petendum, dictavit æquitas, quam ab eruditissimo veritatis simul arbitro, promotore, patrono ; Cui, in maximum honoris symbolum ducerem, si gratitudinem (quam omnes verioris philosophiæ debent cultores) meam levidensi hoc munusculo testatam, posteris relinquerem,

Quod Nomini tuo Sacrum

Humillime Vovet

J. RAPHSO.

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PRÆFATIO



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# PRÆFATIO

## LECTORIBUS GEOMETRIS.

**Q**UAM vobis exhibeo *Æquationum Analysis*, Quomodo mihi occurrit, initio libri dictum est; Et licet a demonstratione incipi, et ratiocinatione etiam *à Mém.*, res a priori deduci pateretur, Methodo tamen eadem qua inveni tradidi, brevitatem, & inventionis ordinem, non famam, Consulens. Quoad rem; Ex *Simplicis Æquationis Solutione*, omnes, cujuscunque dimensionis, *Æquationes solutas* do, Et *facillimam Demonstrationis Methodum* attuli. Nec est cur Novam, simul et meam, non appellarem, Nihil enim hujusmodi (quod scio) unquam exstitit (licet etiam non sine promissis tentatum fuerit) præter *Præstantissimi illius & summi Geometra Dom. Isaaci Newton* cujus aliquid simile memorat; in doctissimo suo *Algebrae tractatu*, vir *Cl<sup>mus</sup>*. *D<sup>r</sup> Johannes Wallis*, sed nec eadem, credo, origine, nec eodem, certe, processu. Methodo etiam valde diversa, *Æquationis primariae*, non *Canonis Vietæi*, potestates quasdam rejicit, in *Methodo sua tangentium curvis inveniendarum* Vir *Cl<sup>mus</sup>*. *Renatus Slufius*, ut videre est in *Transaëtionibus Philosophicis Mensis Jan. 1672*. *Exempla Æquationum quadraticarum* addidi, non quasi, per *Methodum nostram*, quam per *Communem* (licet omnes supra quadraticas per nostram) expeditius resolvantur, sed in rei *Complementum*. Omnes operationum processus (in *Methodi brevitatis Synopsis*) adjunxi. *Præstantiam ejus*, (siqua est) præ cæteris omnibus, vobis determinandam submissus relinquo.

ERRATA.

# ERRATA.

Pag. 5 Col. 4. lin. 19 pro 282834 leg. 2828434. pag. 6 col. 3 l. 21. leg. — 21934881. pag. 7 col. 2 l. 20 leg. — 55830. pag. 11 col. 4 l. 18. pro 6 leg. 14 = c. pag. 14 col. 0 l. 8 pro 2baa leg. 2bbaa. pag. 15 col. 0 l. 4 Interpone a = summa numerorum. col. 2 l. 19 pro 57,68 leg. 576,8. col. 4 l. 10 pro 8,326 leg. 83,26. pag. 17 col. 1 l. 12 pro — 14 = 4 leg — 14 = x. col. 4 l. 24 pro — 13957480,4 = bg leg. — 13957490,4 = bg. pag. 19 col. 2 l. 8 pro b = b leg. b = 9. col. 3 l. 15 pro — 6912 = 3gg leg. — 59,12 = 3gg. col. 4 l. 11 dele 3gg. pag. 21 col. 2 l. 6 pro 4,1 leg. 41. col. 3 l. 21 pro 200298112 leg. 20029,8112. pag. 23 col. 3 l. 27, 28. Interpone lineolam inter <sup>4111164</sup><sub>1111172</sub> pag. 25 col. 1 l. 7 pro 19 = 19 leg. 19 = cg col. 2 l. 8 pro 4 = gg leg. 4 = 4gg. col. 2 pro — 25 = y leg. — 2,5 = x. col. 2 l. 39 pro 2547459 = c leg. = cg. pag. 28 col. 2 l. 13 pro 2bg leg. 3bg. pag. 31 col. 2 Inter 30 & 31 Interijce lineolam. pag. 32 col. 1 l. 19 pro 5,1555 leg. 5,37555 & pro 0377 x leg. 03 = x pag. 33 l. 4 pro 664 leg. 646. pag. 34 l. 2 pro aaa leg. aa. l. 3 leg. convergat pro convergeat. col. 1 scribatur — 5375 = a loco + a. pag. 35 pro convergeat l. convergeat. col. 1 l. 18 pro — 457 leg. + 457. col. 3 pro 48<sup>1</sup> = 340.000 leg. = 340,735. pag. 36 l. 9 pro diviris lege divisoris. lin. ult. pro Canonibus lege Canonibus. pag. 38 col. 1, l. 12 pro baa leg. baaa. pag. 39 col. 3 l. 3 pro 3ggg leg. 3gggg. col. 3 l. 11 pro 3ggg leg. 3gggg. pag. 40 col. 3 l. 4. pro 2bgg leg. 3bgg. pag. 41 col. 1 l. 9 pro baa leg. ba Pag. 43 l. 9 pro octavo lege octava.

Siquæ alia sunt, ut punctationes omisissæ vel malè locatæ, ut & etiam divisores perperam appositæ, velut.

P. C. L

7. 2. 49

9. 2. 17

2. 33

3. 18

10. 2. 15

15. 3. 26

Pro suo libitu Emendet Lector.

# ANALYSIS ÆQUATIONUM, &c.

**C**onsideranti jampridem, infinitarum approximationum, Naturam, oblatum ab amico quodam Problema Speculationem sequentem mihi obtulit; Solutum hoc modo se habuit; quantitas prodiit quæsitæ quasi æqualis, seu intervallo adeo parvo ab æquali distans, ut pro æquali accipi, seu (quod multis etiam usu venit) minutam istam differentiam tuto rejici, posse videretur; Quia vero numeris explicanda fuit solutio, Ex Consideratione numeri fracti, seu (ut dicitur) fractionis, per multiplicationem, in infinitum, diminuendæ, me vero propius accessurum putavi, si non ipsam quantitatem (adeo licet Contemnendam) sed ejus quadratum potius aut cubum vel quamlibet altiore potestatem rejicerem. Quantitati ergo inventæ, partem illam minimam, negligendam, quam notavi per (x) adjunxi (per signum +,) summamq; quadrando, quadratumq; (xx) abjiciendo, ex simplicis æquationis solutione, me, vel defectu, vel excessu (xx) propius vero appropinquasse animadverti; Inventam ergo (hoc modo, partem, quantitatis ignotæ, x,) quantitati jam prius notæ addidi, Et continuato ejusmodi ratiocinio, in methodum, sequentibus Contentam, præceptis, incidi.

## I.

In data qualibet æquatione vel pura vel affectâ, imprimis, divisâ in duas partes, quantitate ignotâ (Scilicet)  $g+x=a$  (quibus literis in sequentibus utor) procedendum est secundum methodum *Vieta* generalem donec formabitur Theorema, quod vocat Syntheticum e. g. sit æquatio proposita, Cubica  $ba-aaa=c$  &  $g+x=a$ .

$$\text{Erit } bg-ggg + \overline{b-3gg}xx - 3gxx - xxx = ba-aaa = c$$

Hic verò primum membrum, Scil. g. suppono tanquam notum, quomodo innotescat statim dicturus.

## II.

E Theoremate *Vieta* (hoc modo) formato, rejiciantur potestates omnes secundi membri, Seu, x, tum puræ, tum coefficientibus complicatæ, retentâ tantum cum suis coefficientibus ipsa quantitate simplici x, unde hujusmodi extabit æquatio.

$$bg-ggg + \overline{b-3gg}xx = c$$

Quam voco Convergentem.

## III.

Ut pote ex cujus æquationis simplicis solutione exurgit Theorema Methodi nostræ fundamentale  $x = \frac{c + ggg - bg}{b - 3gg}$

Quod etiam Convergens Theorema, simul ac partem ejus alteram (x) Convergentem, appello.

## IV.

Inventâ, per Theorema præcedens, membri secundi parte, x, Convergente, addatur vel subtrahatur membro primo, secundum signa + vel — & summa vel residuum rursus nominetur (g,) quæ novæ adhuc x, seu remanenti differentiæ (per signum +) Conjuncta, æquetur (a,) nova autem ista (x) per idem Theorema invenitur (mutatâ, scilicet, semper mutandâ (g) Ex novâ ergo operatione nova rursus enascetur (g) & sic ad infinitum. Tertia vero vel quartâ operatione peracta, usui fere cuilibet sufficiet responsum, ut in exemplis abunde patet.

## V.

Hic x & a intelliguntur Convergentes

Ulteriori vero Reductione quia  $x = \frac{c + ggg - bg}{b - 3gg}$  &  $g + x = a$ , Erit  $g + \frac{c + ggg - bg}{b - 3gg}$

Etiâ æqualis (a), Exinde verò  $a = \frac{c - 2ggg}{b - 3gg}$ , unde si (g) æquaretur (a) exactè,

Solutio esset exactè vera; Scilicet  $a = \frac{c - 2aaa}{b - 3aa}$ . Seu  $b - 3aa) c - 2aaa (a$

Ad finem Exemplorum hæc etiam Methodus illustratur.  $\frac{-ba + 3aaa}{c + 2aa - ba} = 0$

## VI.

Jam vero ad (g) seu primum membrum inveniendum, signetur æquatio punctis, modo, quem docuere *Vieta*, nostratesque *Harriotus* & *Oughtredus*, tum potestas resolvenda, Tum Coefficientes. Punctata æquatione accipiantur, numeri, unius cujusq; primi puncti, Quasi æquatio non nisi ex illis consisteret (ut fit in Problemate 8<sup>vo</sup>), exinde eruatur primum latus singulare, cui tot Circulos adjicias quot ~~fit~~ in Resolvendâ puncta, ut fit in Problemate 5<sup>to</sup>, & inde secundum prædictas regulas operandum. Constructione per parabolam, vel etiam Methodo, de limitibus æquationum, vel facili (operando per Logarithmos) Conjecturâ, quicumque vult, uti possit; Ex variis etiam positis (g) variæ radices, ejusdem æquationis, erui possint. Ut in Prob. 15, 16.

Quo magis autem hujus Methodi universalitas, simulac ~~universalia~~ elucefcat, totumq; demonstratione muniatur, Theorema sequens generale Demonstratum offero.

Theorema

THEOREMA.

Sumatur quantitas quæcunq; = g seu primo membro, dico quantitatem hanc qualemcunque (per Methodum nostram) ad veram tandem radicem Convergere.

Demonstratio Ex sequenti Constructione patet.

Resumatur *Æ*quatio  $ba - aaa = c$

$$\left\{ \begin{array}{l} g + x = a \\ \text{Sivero } g \text{ major esset } a \\ g - x = a \end{array} \right\} \begin{array}{l} \text{Erit } bg - ggg + b - 3ggx - 3gxx - xxx = ba - aaa = c \\ \text{ex inde } x = \frac{c + ggg - bg + 3gxx + xxx}{b - 3gg} \end{array}$$

Inde etiam  $x = \frac{c + ggg - bg}{b - 3gg} + \frac{3gxx + xxx}{b - 3gg}$ , quæ omnia reductione patent Analytica.

Similis Constructio in omnibus omnium generum *æ*quationibus adhibenda est. Ex posita vero (t)  $= \frac{c + ggg - bg}{b - 3gg}$  & (m)  $= \frac{3gxx + xxx}{b - 3gg}$ . Erit  $x = t + m$

Unde liquet tot emergere Casus quot variationes fieri possunt ab (... x = ... t ... m) quæ sunt octo.

$$\begin{array}{rcl} + x & = & + t + m \\ - x & = & - t - m \\ + x & = & + t - m \\ - x & = & - t + m \\ + x & = & - t + m \\ - x & = & + t - m \\ + x & = & - t - m \\ - x & = & + t + m \end{array}$$

Theorema (x = .. t .. m) voco absolutum (& suam x absolutam) ut distinguantur ab (x) = .. t) quibus prius nomina Convergentium indidi.

His ita positis liquido patet.

1. In  $x = + t + m$  (qui casus est  $ba - aaa = c$ ) x convergentem minorem esse absolutâ, quantitate (m) partem scilicet suo toto

x Ergo Convergente (ex hypothesi, seu per præcepta) additâ suâ (g,) liquet hanc novam (g) auctam quantitate (t) majorem esse præcedenti, & hoc modo augeri (g) consequenter vero diminui (m) ad infinitum, post infinitam autem convergentiam, differentiam seu (m) reddi quantitate qualibet assignabili minorem. Eodem processu Evincitur Casus secundus:

Proponatur  $+x = +t - m$ . Seu  $aa = c$   $x = \frac{c - ggg}{2g}$  liquet (x) convergentem majorem esse absolutâ, quantitate (m) subducendâ scilicet non subductâ, addita ergo ad (g) facit (g) majorem quam (a) exinde  $\frac{c - ggg}{2g}$  majorem quam c. Ergo Theorema  $+x = +t - m$  vertitur in casum secundum seu  $-x = -t - m$ , ac proinde descendendo Convergit:

Eodem ratiocinio prospicienti cuivis in *æ*quationum naturam patebit omnes casus reduci ad duos primos, ac proinde convergere, scilicet omnes qui habent (+m) ad primum, qui vero (-m) ad secundum. Quatuor ultimi non sunt possibiles, nisi mutatis signis (x) convertuntur in quatuor primos; Quod cuivis perpendenti facile patebit.

Si



Si quis autem strictiorem demonstrationem desideret hoc modo procedere poterit.  
Ex posita (distinctionis gratiâ)  $z = x$  absolutâ.

## P R O P. I.

Proponatur  $aaa = b$

Sumatur (g) quantitas quæcunque major quam (a). Dico proximam (g) (per methodum nostram) enatam, semper minorem esse præcedenti, majorem verò quam (a,) ac proinde ad verum convergere.

Erit  $g - z = a$  ex hypoth. &  $ggg - 3ggz + 3gzz - zzz = aaa = b$   
Exinde  $-3ggz + 3gzz - zzz = b - ggg$ . Ergo.  $-z + \frac{3gzz - zzz}{3gg} = (\frac{b - ggg}{3gg} = -x)$   
Seu Theoremati convergenti. Ergo  $-z + \frac{3gzz - zzz}{3gg} = -x$  utriq; parti addatur (g)  
Erit.  $g - z + \frac{3gzz - zzz}{3gg} = g - x = g$  novæ, ac proinde (g) nova minor præcedenti, sed  
& etiam  $a + \frac{3gzz - zzz}{3gg} = (g)$  novæ, ergo (g) nova major quam (a) totum scilicet sua  
parte. Q. E. D.

## P R O P. II.

Proponatur  $ba - aaa = c$

Sumatur (g) quantitas quæcunq; minor (a). Dico proximam (g) (per methodum nostram) Enatam, semper majorem esse præcedenti, minorem verò quam (a), ac proinde ad verum Convergere,

Ex hypothesi  $g + z = a$ . Erit  $bg - ggg + b - 3gg \times z - 3gzz - zzz = ba - aaa = c$   
Ergo  $b - 3gg \times z - 3gzz - zzz = c + ggg - bg$ . Ergo  $+z - \frac{3gzz + zzz}{b - 3gg} = (\frac{c + ggg - bg}{b - 3gg} = +x)$   
Seu Theoremati convergenti, inde.  $+z = +x + \frac{3gzz + zzz}{b - 3gg}$  utrique parti addatur (g)  
proveniet  $g + z = a = g + x + \frac{3gzz + zzz}{b - 3gg}$  Sed (g) nova  $= g + x$  major præcedenti,  
quantitate (x,) minor vero (a,) quantitate  $\frac{3gzz + zzz}{b - 3gg}$ , pars suo toto. Q. E. D.

Eodem modo in omnibus procedendum est.

Ex hisce Demonstrationibus varia elici possunt Corollaria ut

I. In Æquationibus de quibus negatur potestas summa, (g) si minor est quam (a) plerumque ad radicem ascendere.

II. In Extrahendis Radicibus puris (g) si minor est (a) semper (operatione prima) ultra radicem ascendere; deinde descendendo convergere.

Multa alia deduci possunt etiam usui maximè conducentia; non pauca etiam aliis in rebus ex hac methodo inveniri possint, quæ tamen aliis relinquo, Sat ducens, viam ostendisse, ni fallor, satis amplam.

P R O.



## PROBLEMA. I.

**E data quantitate Surdâ (2) latus quadratum Educere ?**

Sit  $g \nmid x = a$

Equatio ~~/~~  $a a = c$   
Numeris ~~/~~  $a a = 2$

$$\text{Theor. } x = \frac{c - gg}{2g}$$

$$\begin{aligned} 49 + 29x + x^2 &= 49 = c \\ c - 49 - 29x - x^2 &= 0 \\ c - 49 &= 29x \\ \frac{c - 49}{29} &= x \end{aligned}$$

$$\begin{array}{r} 1 = g \\ \hline 2 = \\ - 1 = 99 \\ \hline 2 = 2 \quad 10(45 = x) \\ \hline 10 \\ \hline 0 \\ \hline 2 = 30 \quad - 250(283 = x) \\ \hline 240 \\ \hline 100 \\ 90 \end{array}$$

$$\begin{array}{r} \cdot \\ 1500 \\ - .083 \\ \hline \cdot \\ 1417 = 8 \\ \cdot \\ 1417 \\ \hline 9919 \\ 1417 \\ 5668 \\ 1417 \\ \hline \cdot \\ -2.007889 \end{array}$$

$$\begin{array}{r} \cdot \\ 1417 \\ - .002783 = x \\ \hline 1414217 = g \\ 1414217 \\ \hline 9899519 \\ 1414217 \\ 2828434 \\ 5656868 \\ 1414217 \\ 5656868 \\ 1414217 \\ \hline 2.000009723089 \\ 2 \end{array}$$

$$\begin{array}{r} 2834) -0.007889 \quad (-2783 = x \\ \underline{5658} \\ 22219 \\ \underline{19838} \\ 23720 \\ \underline{22672} \\ 10480 \\ \underline{9502} \\ 978 \end{array}$$

$$\begin{array}{r}
 282834 \cdot 000009723089 \quad (-3437622 = x) \\
 \hline
 8485302 \\
 \hline
 12377870 \\
 11313736 \\
 \hline
 10641340 \\
 8485302 \\
 \hline
 21560380 \\
 19799038 \\
 \hline
 17613420 \\
 16970604 \\
 \hline
 6423160 \\
 5656868 \\
 \hline
 7712920
 \end{array}$$

$$\begin{array}{r} 1414217 \\ - .000003437622 \\ \hline a = 1.414213562378 \end{array}$$

# Analysis Æquationum, &c.

Si quis autem strictiorem demonstrationem desideret hoc modo procedere poterit.  
Ex posita (distinctionis gratiâ)  $z = x$  absolutæ.

## P R O P. I.

Proponatur  $aaa = b$

Sumatur (g) quantitas quæcunque major quam (a). Dico proximam (g) (per methodum nostram) enatam, semper minorem esse præcedenti, majorem verò quam (a,) ac proinde ad verum convergere.

Erit  $g - z = a$  ex hypoth. &  $ggg - 3ggz + 3gzz - zzz = aaa = b$   
Exinde  $-3ggz + 3gzz - zzz = b - ggg$ . Ergo.  $-z + \frac{3gzz - zzz}{3gg} = \frac{(b - ggg)}{3gg} = -x$   
Seu Theoremati convergenti. Ergo  $-z + \frac{3gzz - zzz}{3gg} = -x$  utriq; parti addatur (g)  
Erit.  $g - z + \frac{3gzz - zzz}{3gg} = g - x = g$  novæ, ac proinde (g) nova minor præcedenti, sed  
& etiam  $a + \frac{3gzz - zzz}{3gg} = (g)$  novæ, ergo (g) nova major quam (a) totum scilicet sua parte. Q. E. D.

## P R O P. II.

Proponatur  $ba - aaa = c$

Sumatur (g) quantitas quæcunq; minor (a). Dico proximam (g) (per methodum nostram) Enatam, semper majorem esse præcedenti, minorem verò quam (a), ac proinde ad verum Convergere,

Ex hypothesi  $g + z = a$ . Erit  $bg - ggg + \overline{b - 3gg} \times z - 3gzz - zzz = ba - aaa = c$   
Ergo  $\overline{b - 3gg} \times z - 3gzz - zzz = c + ggg - bg$ . Ergo  $+z - \frac{3gzz + zzz}{b - 3gg} = \frac{(c + ggg - bg)}{b - 3gg} = +x$   
Seu Theoremati convergenti, inde.  $+z = +x + \frac{3gzz + zzz}{b - 3gg}$  utrique parti addatur (g)  
proveniet  $g + z = a = g + x + \frac{3gzz + zzz}{b - 3gg}$  Sed (g) nova =  $g + x$  major præcedenti,  
quantitate (x,) minor vero (a,) quantitate  $\frac{3gzz + zzz}{b - 3gg}$ , pars suo toto. Q. E. D.

Eodem modo in omnibus procedendum est.

Ex hisce Demonstrationibus varia elici possunt Corollaria ut

I. In Æquationibus de quibus negatur potestas summa, (g) si minor est quam (a) plerumque ad radicem ascendere.

II. In Extrahendis Radicibus puris (g) si minor est (a) semper (operatione prima) ultra radicem ascendere; deinde descendendo convergere.

Multa alia deduci possunt etiam usui maximè conducentia; non pauca etiam aliis in rebus ex hac methodo inveniri possunt, quæ tamen aliis relinquo, Sat ducens, viam ostendisse, ni fallor, satis amplam.

P R O.

## PROBLEMA. I.

**E data quantitate Surdâ (2) latus quadratum Educere ?**

Sit  $g + x = a$

Equation ~~A~~  $a^2 = c$

Numeris-/-  $aa = 2$

$$\text{Theor. } x = \frac{c - gg}{2g}$$

$$\begin{aligned} 49 + 29x + x^2 &= 49 = c \\ c - 49 - 29x - x^2 &= 0 \\ c - 49 &= 29x \\ \frac{c - 49}{29} &= x \end{aligned}$$

$$\begin{array}{r} 1 = g \\ \hline 2 = \\ - 1 = 99 \\ \hline 73 \\ 15 \\ \hline 23 = 2(10(45 = x) \rightarrow 15 \\ 10 \quad - 225 = 99 \\ \hline 200 \\ 0 \quad \hline 23 = 3(0) - 250(283 = x \\ \hline 240 \\ \hline 100 \\ 90 \end{array}$$

$$\begin{array}{r} \cdot \\ 1500 \\ - .083 \\ \hline \cdot \\ 1417 = g \\ \cdot \\ 1417 \\ \hline 9919 \\ 1417 \\ 5668 \\ 1417 \\ \hline \cdot \\ -2.007889 \quad - 99 \\ 2. \end{array}$$

$$\begin{array}{r}
 1417 \\
 - .002783 = x \\
 \hline
 1414217 = g \\
 1414217 \\
 \hline
 9899519 \\
 1414217 \\
 2828434 \\
 5656868 \\
 1414217 \\
 5656868 \\
 1414217 \\
 \hline
 2.000009723089 \\
 2 \\
 \hline
 282834 \cdot 4 \cdot 0.000009723089 (-3437622 = x) \\
 \quad \quad \quad 8485302 \\
 \hline
 12377870 \\
 11313736 \\
 \hline
 10641340 \\
 8485302 \\
 \hline
 21560380 \\
 19799038 \\
 \hline
 17613420 \\
 16970604 \\
 \hline
 6428160 \\
 5656868 \\
 \hline
 7712920
 \end{array}$$

$$\begin{array}{r} 1414217 \\ - .000003437622 \\ \hline a = 1.414213562378 \end{array}$$

## PROBLEM A. II.

Latus Cubicum è Numero (37945) educere ?

Æquatio  $aaa = d$ Numeris  $aaa = 37945$ 

$$\begin{array}{r}
 37 = d \quad 3 = g \quad 30 = g \\
 \quad \quad \quad 03 = x \\
 \hline
 -27 = -999 \\
 374 = 27) 10 (+03 = x \\
 \hline
 3361 \\
 .006472 \\
 \hline
 33603528 = g \\
 379 = 3267) + 2098, (+61 = x \\
 \hline
 19692 \\
 4780 \\
 \hline
 33603528 = g \\
 33603528 \\
 268828224 \\
 67207056 \\
 168017640 \\
 100810584 \\
 2016211680 \\
 100810584 \\
 100810584 \\
 \hline
 1129,197094046784 = 99 \\
 33603528 \\
 9033576752374272 \\
 2258394188093568 \\
 5645985470233920 \\
 3387591282140352 \\
 67751825642807040 \\
 3387591282140352 \\
 3387591282140352 \\
 \hline
 -37945,006167319739453952 = 999 \\
 37945
 \end{array}$$

$$33875913) - .006167319739453952 (-182056192 = x$$

$$\begin{array}{r}
 32875913 \\
 \hline
 277972843 \\
 271007304 \\
 \hline
 69655399 \\
 67751826 \\
 \hline
 190357345 \\
 169379565 \\
 \hline
 209777803 \\
 203255478 \\
 \hline
 65223259 \\
 33875913 \\
 \hline
 313473465 \\
 304883217 \\
 \hline
 085902482
 \end{array}$$

$$\text{Theor. } x = \frac{d - 888}{388}$$

$$\begin{array}{r}
 3300 \\
 61 \\
 \hline
 3361 = g \\
 3361 \\
 \hline
 3361 \\
 20166 \\
 10083 \\
 10083 \\
 \hline
 11296321 = 99 \\
 3361 \\
 \hline
 11296321 \\
 67777926 \\
 33888963 \\
 33888963 \\
 \hline
 -37966934881 = 999 \\
 37945
 \end{array}$$

$$388 = 33889) - 21934881 (- .006472 = x$$

$$\begin{array}{r}
 33603528 \\
 - .00000182056192 \\
 \hline
 a = 33,60352617943808 \text{ Q. E. I.}
 \end{array}$$

# PROBLEMA. III.

Latus Biquadraticum è numero (2741583974) educere ?

$$\text{Æquatio } aaaa = f$$

$$\text{Numeris } aaaa = 2741583974.$$

$$\text{Theorema } x = f - \frac{2222}{4666}$$

$$\text{Sit } 2 = g$$

$$\begin{array}{r} 27 \\ 16 \end{array}$$

$$32) 110 (+ 3 = x$$

$$20$$

$$3$$

$$23 = g$$

$$23$$

$$69$$

$$46$$

$$529$$

$$23$$

$$1587$$

$$1058$$

$$12167$$

$$23$$

$$36501$$

$$24334$$

$$-279841 = -2222$$

$$274158$$

$$4888 = 48668) - 56830 (-1 = x$$

$$48668$$

$$8162$$

$$229.000$$

$$-176$$

$$228824 = g$$

$$228824$$

$$915266$$

$$457648$$

$$1830592$$

$$1830592$$

$$457648$$

$$457648$$

$$52360422976$$

$$228824$$

$$209441691904$$

$$104720845952$$

$$418883383808$$

$$418883383808$$

$$104720845952$$

$$104720845952$$

$$11981321,427060224$$

$$228824$$

$$47925285708240896$$

$$23962642854120448$$

$$95850571416481792$$

$$95850571416481792$$

$$23962642854120448$$

$$23962642854120448$$

$$479252857) - 2741613894,225628696576 (-62439802 \text{ Quotiens} = x$$

$$2741583974$$

$$29920,225628696576$$

$$230$$

$$-1$$

$$229 = g$$

$$229$$

$$2061$$

$$458$$

$$453$$

$$52441$$

$$229$$

$$471969$$

$$104882$$

$$104882$$

$$12008989$$

$$229$$

$$108080901$$

$$24017978$$

$$24017978$$

$$-2750058481$$

$$2741583974$$

$$48035956) - 847450750 (-176 = x$$

$$48035956$$

$$367091140$$

$$336251692$$

$$308394480$$

$$228824$$

$$- .00062439802$$

$$a = 228,82337560198 \text{ Q. E. I.}$$

B 2

PRO-

## PROBLEMA. IV.

E dato 2327834559873 Numero potestatis quintæ latus Educere.

$$aaaaa = f$$

$$\text{Numeris } aaaaa = 2327834559873.$$

$$\text{Theor. } x = \frac{f - 88888}{58888}$$

$$\begin{array}{r} 3 = g \\ 3 \\ \hline 9 \\ 3 \\ \hline 27 \\ 3 \\ \hline 81 \\ 3 \\ \hline -243 \\ 232 \\ \hline 405) -1100 (-02 = x \end{array}$$

$$\begin{array}{r} 298.000 \\ -564 \\ \hline a = 297.436 \end{array}$$

$$\begin{array}{r} 300 \\ -02 \\ \hline 298 = g \\ 298 \\ \hline 2384 \\ 2682 \\ 596 \\ \hline 88804 \\ 298 \\ \hline 710432 \\ 799236 \\ 177608 \\ \hline 26463592 \\ 298 \\ \hline 211708736 \\ 238172328 \\ 52927184 \\ \hline 7886150416 = 88888 \\ 298 \\ \hline 63089203328 \\ 70975353744 \\ 15772300832 \\ \hline -2350072823968 = 88888 \\ 2327834559873 \\ \hline 88888 = 39431) -222382640950 (-564 \\ 197155 \\ \hline 252276 \\ 236586 \\ \hline 156904 \end{array}$$

S O.



Solutio Aequationum Affectarum.

PROBLEMA. V.

Proponatur Aequatio quadratica  $aa + ba = c$   
 Numeris ..  $aa + 587a = 987459$ .

Theor.  $x = \frac{c - 88 - bg}{2g + b}$

$$\begin{array}{r} 8 = g \\ \hline 98 \\ \hline 64 \\ 40 \\ \hline -104 \\ \hline 21) -6,0 (-2 = x \end{array}$$

$$\begin{array}{r} 80 \\ -2 \\ \hline 78 = g \quad 78 \\ 78 \quad 58 \\ \hline 624 \quad 624 \\ 546 \quad 390 \\ \hline 6084 \quad 4524 \\ 4524 \\ \hline -10608 \\ 9874 \\ \hline 156) -734 (-3,4 = x \\ 58 \quad 642 \\ \hline 214 \quad 920 \end{array}$$

$$\begin{array}{r} 78 \\ -34 \\ \hline 746 = g \\ 746 \\ \hline 4476 \quad 587 \\ 2984 \quad 746 \\ \hline 5222 \quad 3522 \\ 556516 \quad 2348 \\ 437902 \quad 4109 \\ \hline -994418 \quad 437902 \\ 987459 \\ \hline 1492) -6959 (-3,34 = x \\ 587 \quad 6237 \\ \hline 2079 \quad 7220 \\ 6237 \\ \hline 9830 \end{array}$$

$$\begin{array}{r} 746 \\ -334 \\ \hline 74266 \\ 74266 \\ \hline 445596 \\ 445596 \\ 148532 \\ 297064 \\ 519862 \\ \hline 5515438756 \\ 435941.42 \\ \hline -987485,2956 \\ 987459 \\ \hline 20723) -26,2956 (-12689 = x \\ 20723 \\ \hline 55726 \\ 41446 \\ \hline 142800 \\ 124338 \\ \hline 184620 \\ 165784 \end{array}$$

$$\begin{array}{r} 74266 \\ -12689 \\ \hline a = 742,647311 \end{array}$$

P R O.

# PROBLEMA. VI.

Sit  $\mathcal{A}$ Equatio Secundæ (ut vocant) Formulæ.

$$aa - ba = c$$

$$\text{Numeris } aa - 5a = 31$$

$$\text{Theor. } x = \frac{c + bg - gg}{2g - b}$$

$$\begin{array}{r} 8 = g \\ \hline 31 \\ 40 \\ \hline + 71 \\ - 64 \\ \hline 11) + 70 (+ 6 = x \end{array}$$

$$\begin{array}{r} 80 \\ 6 \\ \hline 86 = g \\ 86 \\ \hline 516 \\ 688 \\ \hline 172) + .0400 (+ 32 = x \\ 5 \quad 366 \\ \hline 122 \quad 340 \end{array}$$

$$\begin{array}{r} 86032 \\ .000077808 \\ \hline a = 8,603277808 \text{ Q. E. I.} \end{array}$$

$$\begin{array}{r} 8600 \\ + .0032 \\ \hline 86032 = g \\ 86032 \\ \hline 172064 \\ 258096 \\ 5161920 \\ 688256 \\ \hline - 7401505024 \\ 7401600 \\ \hline 122064) .000949760 (+ 77808 = x \\ 854448 \\ \hline 953120 \\ 854448 \\ \hline 986720 \\ 976512 \\ \hline 102080 \end{array}$$

PRO-

## PROBLEMA. VII.

Sit  $\mathcal{A}$ equatio quadratica Tertiæ formæ

$$ba - aa = c$$

$$\text{Numeris } 8a - aa = 14$$

$$\text{Theor. } x = \frac{c + gg - bg}{b - 2g}$$

$$\begin{array}{r} 2 = g \\ 14 \\ 4 \\ 18 \\ -16 \\ \hline 4) + 20 \text{ (}.5 = x \end{array}$$

$$\begin{array}{r} 25 = g \\ 25 \\ 125 \\ 50 \\ 625 \\ 14 \\ 2025 \\ 20.0 \\ \hline 3) + .25 \text{ (+ } 83 = x \end{array}$$

$$\begin{array}{r} 2583 = g \\ 2583 \\ 7749 \quad 5166 \\ 20664 \quad 2834 \\ 12915 \quad 2834 \\ 5166 \\ 6671889 \\ 14 \\ 20671889 \\ 20664 \end{array}$$

$$\begin{array}{r} 2583 \\ + .002783 \\ \hline 2585783 = g \\ 2585783 \\ 7757349 \\ 20686264 \\ 18100481 \\ 12928915 \\ 20686264 \\ 12928915 \\ 5171566 \end{array}$$

$$\begin{array}{r} 2834) + .007889 (+ 2783 = x \\ 20,686273723089 \\ 20,686264 \end{array}$$

$$\begin{array}{r} 2,585783 \\ .000003437622 \\ \hline a = 2,585786.437622 \text{ Q. E. I.} \end{array}$$

$$2828434(.000009723089(3437622 = x$$

PRO-

## P R O B L E M A. VIII.

Solutio *Æ*quationum Cubicarum.Proponatur  $aaa + ba = c$ . *Æ*quatio Cubica primæ Formulæ.Numeris  $aaa + 24 a = 587914$ . *Theor.*  $x = \frac{c - 288 - bg}{388 + b}$ *Æ*quatione punctis (ut ostendimus) notatâ

$$aaa + 024 a = 587914$$

hoc est,  $aaa + 0a = 587$ , unde  $g = 8$ , & sic de cæteris.

$\begin{array}{r} -512 = 888 \\ -00 = bg \end{array}$	$\begin{array}{r} 64 \\ 3 \end{array}$	$\begin{array}{r} 80 \\ 3 \end{array}$	$\begin{array}{r} 83.00 \\ 68 \end{array}$	
$\begin{array}{r} -512 \\ 587 = c \end{array}$	$\begin{array}{r} 192 = 388 \\ 0 = b \end{array}$	$\begin{array}{r} 83 = g \text{ Novz} \\ 83 \end{array}$	$\begin{array}{r} 8368 = g \\ 8368 \end{array}$	$\begin{array}{r} 8368 \\ 24 \end{array}$
$192)4750(3=x$	$192$	$\begin{array}{r} 249 \\ 664 \\ 6889 \\ 83 \end{array}$	$\begin{array}{r} 6889 \\ 3 \\ 20667 \\ 24 \\ 20691 \end{array}$	$\begin{array}{r} 66944 \\ 50208 \\ 25104 \\ 66944 \end{array}$
		$\begin{array}{r} 20667 \\ 55112 \end{array}$	$\begin{array}{r} 70023424 \\ 8368 \end{array}$	$\begin{array}{r} 33472 \\ 16736 \end{array}$
		$\begin{array}{r} 571787 = 888 \\ 1992 = bg \end{array}$	$\begin{array}{r} 560187392 \\ 420140544 \\ 210070272 \\ 560187392 \end{array}$	$\begin{array}{r} 210070272 \\ 24 \end{array}$
		$\begin{array}{r} -573779 \\ 587914 \end{array}$	$\begin{array}{r} 585956012032 = 888 \\ 2008.32 = bg \end{array}$	$\begin{array}{r} 21031.0272 \end{array}$
		$20691) + 141350 (-68 = x$	$\begin{array}{r} -587964.332032 \\ + 587914 \end{array}$	
		$\begin{array}{r} 172040 \\ 165528 \end{array}$	$\begin{array}{r} 21031) - 50.332032 (-002393 = x \\ 42062 \end{array}$	
		$06512$	$\begin{array}{r} 82700 \\ 63093 \end{array}$	
			$\begin{array}{r} 196073 \\ 189279 \end{array}$	
			$\begin{array}{r} 067942 \\ 63093 \end{array}$	
			$4849$	

$$\begin{array}{r} 8363 \\ -0.002393 \\ \hline a = 83.677607 \text{ Q. E. I.} \end{array}$$

P R O.

## PROBLEMA IX.

Proponatur  $a a a - b a = c$  Aequatio secunda Formula.Numeris  $a a a - 2 a = 5$ Theor.  $x = c + bg - 888$ 

$$\begin{array}{r}
 2 = g \quad 5 = c \quad 2,1 = g \\
 4 = bg \quad 2,1 \\
 8 = 888 \\
 388 = 12 + 9 \quad 9 = 21 \quad 4,2 = bg \\
 b = -2 \quad 42 \quad 5, = c \\
 10) 11,0 (+,1 = x \\
 4,41 = 88 \quad 9,2 \\
 2,1 \\
 441 \\
 882 \\
 388 = 13,23 \quad 9,261 = 888 \\
 b = -2, \quad + 9,200 \\
 + 11,23) \quad - ,06100 (- ,0054 = x \\
 13,16204748 = 388 \quad 4,1892 = bg \\
 - 2, = b \quad 5, = c \\
 + 11,16204748 \quad 9,1892 \\
 4,189102966 = bg \\
 5, = c \\
 9,189102966 = bg + c \\
 13,161437744812497867 = 388 \\
 - 2, = b \\
 + 11,161437744812497867 \\
 2,094551483 \\
 - ,0000000014572895859 \\
 a = 2,0945514815427104141 Q. E. I. \\
 4,1891029660 \\
 4,387145914937499289 = 88 \\
 2,094551483 \\
 13161437744812497867 \\
 35097167319499994312 \\
 17548583659749997156 \\
 4387145914937499289 \\
 21935729574687496445 \\
 21935729574687496445 \\
 17548583659749997156 \\
 39484313234437493601 \\
 87742918298749985780 \\
 - 9,189102982269730988086395587 = 888 \\
 + 9,189102966 = bg + c \\
 + 11,1614377448125) - ,000000016269730988086395587 (- 14572895859 = x
 \end{array}$$

C

P. R. O.





## PROBLEMA. XI.

Differentia duorum numerorum est 4 = d  
 Et si ducatur summa in Rectangulum productus erit III = 1  
 Quærantur Numeri.  $a = \text{summa numerorum}$

Erit Aequatio  $aaa - dda = 4l$   
 hoc est  $aaa - ba = c$

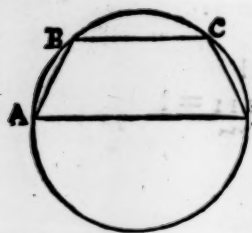
Numeris  $aaa - 16a = 444$ .

$$\text{Theor. } x = \frac{c + bg - 888}{388 - b}$$

$\begin{array}{r} 8 = g \\ + 128 = bg \\ - 512 = 888 \quad 444 = c \\ + 572 \\ \hline + 176 + 600 (+, 3 = x) \\ \hline 64 = 88 \\ 3 \\ \hline 192 \\ - 16 = b \\ \hline 388 - b = 176 \end{array}$	$\begin{array}{r} 8,3 = g \quad 83 \\ 8,3 \quad 16 \\ \hline 249 \quad 498 \\ 664 \quad 83. \\ \hline 6889 \quad bg = 1328 \\ 83 \quad c = 444 \\ \hline 20677 \quad 576.8 = bg + c \\ 55112 \end{array}$	$\begin{array}{r} 8,300 \\ .026 \\ \hline 8,326 = g \\ 8,326 \\ \hline 49956 \\ 16652 \\ 24978 \\ 66608 \\ \hline 69,322276 = 888 \\ 8,326 \\ \hline 415933656 \\ 138644552 \\ 207966828 \\ 554578208 \\ \hline - 577,177269976 = - 888 \\ + 577,216 = bg + c \\ \hline 207,96 + 0.038730024 (+ 2017 = x \\ - 16 \quad 38392 \\ \hline + 191,96 = 388 - b \quad 33802 \\ 19196 \\ \hline 146064 \\ 134372 \\ \hline 11692 \end{array}$	$\begin{array}{r} 8,326 = g \\ 15 = b \\ \hline 49956 \\ 8326 \\ \hline 133,216 = bg \\ 444 = c \\ \hline 577.216 \end{array}$
$\begin{array}{r} 388 - b = 176 \\ \hline 388 - b = 190,7 + 5.013 (+ .026 = x \\ 3814 \\ \hline 11990 \\ 11442 \\ \hline 0548 * \\ \hline 206,67 = 388 \\ - 16, = - b \\ \hline 190,67 \end{array}$	$\begin{array}{r} - 571,787 = 888 \\ + 571,68 \\ \hline 388 - b = 190,7 + 5.013 (+ .026 = x \\ 3814 \\ \hline 11990 \\ 11442 \\ \hline 0548 * \\ \hline 206,67 = 388 \\ - 16, = - b \\ \hline 190,67 \end{array}$	$\begin{array}{r} 415933656 \\ 138644552 \\ 207966828 \\ 554578208 \\ \hline - 577,177269976 = - 888 \\ + 577,216 = bg + c \\ \hline 207,96 + 0.038730024 (+ 2017 = x \\ - 16 \quad 38392 \\ \hline + 191,96 = 388 - b \quad 33802 \\ 19196 \\ \hline 146064 \\ 134372 \\ \hline 11692 \end{array}$	$\begin{array}{r} 8,326 = g \\ 15 = b \\ \hline 49956 \\ 8326 \\ \hline 133,216 = bg \\ 444 = c \\ \hline 577.216 \end{array}$

$$\begin{array}{r} 8,3260000 \\ + 2017 \\ \hline a = 8,3262017 \text{ Q. E. I.} \end{array}$$

C 2 PRO.



## PROBLEMA. XII.

Sit ABCD Trapezium Circulo inscriptum, Cujus unum  
latus Circuli Diameter = a Quæritur.

$$AB = b = 3, BC = c = 4, CD = 5 = d.$$

$$\text{Æquatio } \left. \begin{array}{l} -bb \\ -cc \\ -dd \end{array} \right\} a = 2cbd$$

$$\text{vel } \begin{array}{l} aaa - qa = r \\ \text{Numeris } aaa - 50a = 120 \end{array}$$

$$\text{Theorema } x = \frac{r + qg - 888}{388 - q}$$

$\begin{array}{r} 8 = g \\ 120 = r \\ 400 = qg \\ + 520 \\ - 512 = 888 \\ 142) + 8.00 (+ .05 = x \\ 7 \ 10 \\ \hline 50 \\ \hline r = 120 \\ qg = 402.5 \\ r + qg = 522.5 \\ 388 = 194.4075 \\ q = - 50 \\ \hline 144.4075 \end{array}$	$\begin{array}{r} 64 = 88 \\ 3 \\ \hline 192 \\ - 50 = q \\ \hline 142 \\ \hline 3240125 \\ 51842000 \\ - 521,660125 = 888 \\ 522.5 = r + qg \\ 144.4) .839875 (+ .0058 = x \\ 7220 \\ \hline 11787 \\ 11552 \\ \hline 2355 \end{array}$	$\begin{array}{r} 8.05 \\ + .0058 \\ \hline 8.0558 = g \\ 8.0538 \\ \hline 644464 \\ 402790 \\ 402790 \\ 6444640 \\ \hline 64,89591364 = 88 \\ 8,0558 \\ \hline 51916730912 \\ 32447956820 \\ 32447956820 \\ 519167309120 \\ \hline - 522,788501101112 = 888 \\ 522.79 = r + qg \\ \hline 144,687) .001498898888 (10359 = x \\ 144687 \\ \hline 528288 \\ 434061 \\ \hline 862278 \\ 723435 \\ \hline 1388438 \\ 1302183 \\ \hline 86255 \end{array}$	$\begin{array}{r} 8,0558 \\ + .000010359 \\ \hline a = 8,055810359 \text{ Q. E. I.} \end{array}$
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PRO-

# PROBLEMA XIII.

17

In Triangulo Rectangulo plano, datur summa Hypothenusæ & Perpendicularis

278 = s. Datur etiam Area 7269 = p. Quæritur Basis (a.)

Erit Aequatio s + a — aaa = 4 s p Tertiæ formulæ.

vel b a — aaa = c

Numeris 77284a — aaa = 8083128.

$$\begin{array}{r}
 200 = g \\
 8000000 = 888 \\
 8083128 = c \\
 16083128 \\
 -15456800 = bg \\
 -42716 + 626328 (-14 = y)
 \end{array}$$

$$\begin{array}{r}
 b = 77284 \\
 g = 200 \\
 -15456800 \\
 + 77284 = b \\
 -120000 = 388 \\
 -42716
 \end{array}$$

$$\begin{array}{r}
 200 \\
 -14 \\
 186 = g \\
 186 \\
 + 77284 = b \\
 -103788 = 388 \\
 -26504
 \end{array}$$

$$\begin{array}{r}
 34596 = gg \\
 186 \\
 207576 \\
 276763 \\
 34596 \\
 6434856 \\
 c = 8083128 \\
 14517984 \\
 -14374824 = bg \\
 -26504 + 143160 (-54 = x)
 \end{array}$$

$$\begin{array}{r}
 180,6 \\
 -5,854 \\
 179,8146 \text{ vel } 179,814 = g \\
 179,814 \\
 g = 179,814 \\
 b = 77284 \\
 719256 \\
 1438512 \\
 359628 \\
 1258698 \\
 1258698 \\
 -13896745,176
 \end{array}$$

$$\begin{array}{r}
 32333,074596 = gg \\
 179,814 \\
 129332298384 \\
 32333074596 \\
 258664596768 \\
 290997671364 \\
 226331522172 \\
 32333074596 \\
 5813939,475405144 = 888 \\
 8083128 = c \\
 13897067,475405144 \\
 -13896745,176 = bg \\
 -19715,224 + 322,299405144 (-,c15348 = x)
 \end{array}$$

$$\begin{array}{r}
 Theor. x = \frac{c + 888 - bg}{b - 388} \\
 186 \\
 -5,4 \\
 180,6 = g \\
 180,6 \\
 10836 \\
 144480 \\
 1806 \\
 32616,36 = gg \\
 180,6 \\
 19569816 \\
 260930880 \\
 3261636 \\
 5890514,616 = 888 \\
 8083128 = c \\
 13973642,616 \\
 -13957480,4 = bg \\
 b - 388 = -20565,1 + 16152,216 (-,7854 = x) \\
 1439557 \\
 1756646 \\
 1645208 \\
 1114380 \\
 1028255 \\
 86125 \\
 -96999,223788 = 388 \\
 + 77284 = b \\
 -19715,223788 \\
 179,814 \\
 -,016348 \\
 a = 179,797652 Q. E. I.
 \end{array}$$

P R O.

## PROBLEMA. XIV.

Tri-Sectio Anguli.

Datur  $\left\{ \begin{array}{l} \text{Radius Circuli} = r \\ \text{Chorda arcus} = c \end{array} \right\}$  Quæritur (a) Chorda Tertiæ partis arcus?

Æquatio  $3rra - aaa = crr$  inveniatur Chorda 20 gr. Tertiæ (Scil.) partis Sextantis.

Hoc Casu  $c = r = 10.000$  & æquatio  $.300a - aaa = 1000$

(Scil.)  $ba - aaa = c$

Ex eodem cum præcedenti Theoremate.

$$\begin{array}{r} 3 = g \\ 27 = ggg \\ 1000 = c \\ 1027 \\ -900 = bg \\ +273 \end{array} \quad \begin{array}{r} 300 = b \\ 3 = g \\ 900 \end{array} \quad \begin{array}{r} 300 = b \\ 388 = -27 \\ +273 \end{array}$$

$$\begin{array}{r} 3.4 = g \\ 3.4 \\ 136 \\ 102 \end{array} \quad \begin{array}{r} g = 3.4 \\ b = 300 \\ 1020.0 \end{array}$$

$$\begin{array}{r} 11.56 = gg \\ 3.4 \\ 4624 \\ 3468 \end{array} \quad \begin{array}{r} b = 300 \\ 388 = -34.68 \\ +265.32 \end{array}$$

$$\begin{array}{r} 39.304 = ggg \\ 1000 = c \\ 1039.304 \\ -1020 = bg \end{array}$$

$$\begin{array}{r} +265.32 + 19.3040 (+.072 = x \\ 185724 \\ 73160 \end{array}$$

$$\begin{array}{r} 3.4729636 = g \\ 300 = b \\ 1041.889080 \end{array}$$

$$\begin{array}{r} 300 = b \\ -35.18442850078488 = 388 \\ +263.81557149921512 \end{array}$$

$$\begin{array}{r} 3.400 \\ +.072 \\ 3.472 = g \\ 3.472 \\ 6944 \\ 24304 \\ 13888 \\ 10416 \\ 12,054784 = gg \\ 3.472 \\ 24109568 \\ 84383488 \\ 48219136 \\ 36164352 \\ 41,854210048 = ggg \\ 1000. = c \\ 1041,854210048 \\ -1041,6 = bg \\ +.254210048 (+9636 \end{array}$$

$$\begin{array}{r} b = 300 \\ 388 = -36,164352 \\ +263,833648 \end{array}$$

$$\begin{array}{r} 3.472 \\ +.0009636 \end{array}$$

$$\begin{array}{r} 3.4729636 = g \\ 3.4729636 \end{array}$$

$$\begin{array}{r} 12,06147616692496 = gg \\ 3.4729636 = g \end{array}$$

$$\begin{array}{r} 41,889067689997910011456 = ggg \\ 1000. = c \end{array}$$

$$\begin{array}{r} 1041,889067689997910011456 \\ -1041,88908 = bg \end{array}$$

$$+263,8155715) - .000012310002089988544 (-.000000046661393$$

$$\begin{array}{r} 3.4729636 \\ - .000000046661393 \end{array}$$

$$= 3.472963553338607 \text{ Q. E. I.}$$

P R O.

## PROBLEMA. XV.

Jam verò proponatur alia quævis æquatio Cubica,

(e. g.) Sit  $b a a - a a a = c$

Numeris  $9 a a - a a a = 100$

Theor.  $x = \frac{c + ggg - bbg}{2bg - 3gg}$

Sit  $3 = g$

$$\begin{array}{r}
 18 = 2b \\
 \begin{array}{r}
 3 \quad 27 = ggg \quad 9 \\
 \hline
 54 \quad 100 = c \quad 9 \\
 \hline
 -27 \quad 127 \quad 81 \\
 \hline
 -81 = bbg \\
 \hline
 +27 + 46 (+1 = x)
 \end{array}
 \end{array}$$

$$\begin{array}{r}
 3 \quad gg = 16 \\
 \hline
 +1 \quad b = 19 \\
 \hline
 4 = g \quad 144 \\
 \hline
 gg = 64 \quad 2b = 18 \\
 c = 100 \quad g = 4 \\
 \hline
 164 \quad +72 \\
 -144 \quad 388 = -48 \\
 \hline
 +24) 200 (+38 = x \quad 24
 \end{array}$$

$$\begin{array}{r}
 499 \\
 + .00996 \\
 \hline
 4,99996 = g \\
 4,99996 \\
 \hline
 2999976 \\
 4499964 \\
 4499964 \\
 4499964 \\
 4499964 \\
 1999984 \\
 \hline
 gg = 24,9996000016 \\
 49,9996 \\
 \hline
 1499976000096 \\
 2249964000144 \\
 2249964000144 \\
 2249964000144 \\
 2249964000144 \\
 999984000064 \\
 \hline
 ggg = +124,99700002399936 \\
 c = 1 \\
 \hline
 + 224,99700002399936 \\
 bbg = -224,9964000144 \\
 \hline
 2gb - 3gg = 15,00048 \dots 00060000959993 (+39999, \&c. = x
 \end{array}$$

$$\begin{array}{r}
 4,8 = g \\
 4,8 \\
 \hline
 384 \\
 192 \\
 \hline
 230,4 \quad 9,6 \quad 4,8 \\
 4,8 \quad 9 \quad +1,188 \\
 \hline
 18432 \quad 4,988 \\
 9216 \quad 86,4 = 2bg \\
 \hline
 -69,12 = 3gg \\
 \hline
 ggg = 110,592 \\
 c = 100 \quad 17,28 \\
 \hline
 210,592 \\
 -207,36 = bbg \\
 \hline
 +17,28 + 3,232 (+188 = x
 \end{array}$$

$$\begin{array}{r}
 998 = 2g \\
 9 = b \\
 \hline
 89,82 \\
 -74,7003 = 3gg \\
 \hline
 +15,1197
 \end{array}$$

$$\begin{array}{r}
 4,99996 \\
 399996 \\
 \hline
 a = 4,9999999996 \text{ Q.E.I. Scilicet } g = a \text{ exactè}
 \end{array}$$

$$\begin{array}{r}
 224,1009 \\
 224,1009 \\
 996004 \\
 \hline
 ggg = 124,251409 \\
 c = 1 \\
 \hline
 224,251499 \\
 -224,1009 = bbg \\
 \hline
 15,12) 1,50599 (+996 = x
 \end{array}$$

$$\begin{array}{r}
 4,99996 \\
 399996 \\
 \hline
 224,1009 \\
 224,1009 \\
 996004 \\
 \hline
 ggg = 124,251409 \\
 c = 1 \\
 \hline
 224,251499 \\
 -224,1009 = bbg \\
 \hline
 15,12) 1,50599 (+996 = x
 \end{array}$$

P R O.

## PROBLEMA XVI.

Ex eadem æquatione rescripta alteram radicem elicere

$$baa - aaa = c$$

$$9aa - aaaa = 100$$

Quæritur a?

$$\text{Theor. } x = \frac{bga - 2gg}{388 - 2bg}$$

7 = g	69 = g	
18 = 2b 49	69	
7      3	621	14283 = 388
126 + 147 = 388	414	-1242 = 2bg
-126 = 2bg	47561 = 88	
+ 21	6,9	1863
	42849	6,9
	28566	18
49	328,509 = 888	
9	I = c	552
441 = bgg	-428509	69
343 = 888	42849 = bgg	124,2 = 2bg
100 = c		
-443	1863	-01900 (-102 = x
21) -2,6(-, I = x	1863	
	3700	

690000
,00102
689898 vel 68989 = g
68989
620901
551912
620901
551912
413934
4759482121 = 88
68989
42835339089
38075856968
42835339089
38075856968
28556892726
-428351912045669 = 888 + c
428.35339089 = bgg

186042) + .001478844331 (+ .000079489 = x
1302294
1765503
1674378
911253
744168
1670851
1488336
182515

142,78446363 = 388
124,1802 = 2bg
18,60426363

68989
+000079489
a = 6,898979489 Majori. Q. E. I.

P R O.



## PROBLEMA. XVII.

Ponatur  $a a a + b a a + c a = d$  Aequatio Cubica cum omnibus Terminis.

Numeris  $a a a + 74 a a + 8729 a = 560783$ .

$$\text{Theor. } x = \frac{d - gg + bg + c}{c + 3g + 2b \times g}$$

$\begin{array}{r} 4 = g \\ 16 = gg \\ 28 = bg \\ 87 = c \\ \hline 131 \\ 4 \\ \hline -524 \\ \hline 560 = d \\ 191 \end{array}$ $\begin{array}{r} 12 = 3g \\ 14 = 2b \\ 26 \\ 4 \\ \hline 104 \\ 87 = c \\ \hline 191 \end{array}$ $\begin{array}{r} 41 = g \\ 41 \\ \hline 41 \\ 164 \\ \hline 1681 = gg \\ 3034 = bg \\ 8729 = c \\ \hline 13444 \\ 41 \\ \hline 13444 \\ 53776 \\ \hline -551204 \\ \hline 560783 = d \end{array}$ $\begin{array}{r} 123 = 3g \\ 148 = 2b \\ \hline 271 \\ 41 = g \\ \hline 471 \\ 1084 \\ \hline 11111 \\ + 8729 = c \\ \hline 19840 \end{array}$ $\begin{array}{r} 19840 + 95790 (48 = x) \\ \hline 79360 \\ \hline 164300 \\ 158700 \\ \hline 55820 \end{array}$	$\begin{array}{r} 41,48 = g \\ 74 = b \\ \hline 16592 \\ 29036 \\ \hline 3069,52 \\ \hline 124,44 \\ 148 \\ \hline 272,44 \\ 41,48 \\ \hline 2179,52 \\ 108976 \\ 27244 \\ \hline 108976 \\ \hline 11300,8112 \\ 8729 \\ \hline 200298112 \end{array}$ $\begin{array}{r} 41 \\ + .48 \\ \hline 41,48 = g \\ 41,48 \\ \hline 33184 \\ 16592 \\ 4148 \\ \hline 16592 \\ \hline 1720,5904 = gg \\ 3069,52 = bg \\ 872,9 = c \\ \hline 13519,1104 \\ 4148 = g \\ \hline 1081528832 \\ 540764416 \\ 135191104 \\ 540764416 \\ \hline -560772699392 \\ \hline 560783 = d \end{array}$ $\begin{array}{r} 20030 \cdot 10300608 (4514 = x) \\ \hline 100150 \\ \hline 28560 \\ 20030 \\ \hline 85308 \\ 80120 \\ \hline 5188 \end{array}$
--	--

$$\begin{array}{r} 41480000 \\ + .000514 \\ \hline a = 41,480514 \text{ Q. E. I.} \end{array}$$

D

P R O.

## PROBLEMA XVIII.

Proponatur  $aaa - baa + ca = d$ Numeris  $aaa - 65aa + 914a = 98746$ .

$$\begin{array}{rcl}
 g = 7 & 888 = 343 & 388 = 147 \\
 c = 63 & c = +9 & 12 \\
 88 = 49 & & 7 \\
 b = 6 & & 84 \\
 \hline
 294 & & \\
 d = 98 & & \\
 \hline
 +392 & 70 & 4624 = 88 \\
 -405 & -2 & 65 = b \\
 \hline
 72) -140(-2 = x & 68 = g & 23120 \\
 & 68 & 27744 \\
 \hline
 c = 914 & 544 & 300560 = bgg \\
 g = 68 & 408 & 98746 = d \\
 \hline
 7312 & 4624 & +399306 \\
 5184 & 68 & -376584 \\
 \hline
 cg = 62152 & 36992 & 5946) 22722 (+3,8 = x \\
 & 27744 & 17838 \\
 \hline
 314432 & & 48840 \\
 62152 & 68 & \\
 -376584 & 3.8 & \\
 \hline
 g = 71.8 & c = 914 & \\
 71.8 & g = 71.8 & \\
 \hline
 5744 & 7312 & \\
 718 & 914 & \\
 5026 & 6398 & \\
 \hline
 5155.24 & 65625.2 & \\
 71.8 & & \\
 \hline
 4124192 & & \\
 515524 & & \\
 3608668 & & \\
 \hline
 370145.232 = 888 & & \\
 65625.2 = cg & & \\
 -435771.432 & & \\
 \hline
 71.8 & g = 71.526 & \\
 -274 & c = 914 & \\
 \hline
 g = 71.526 & & \\
 71.526 & & \\
 \hline
 429156 & 286104 & \\
 143052 & 71526 & \\
 357630 & 643734 & \\
 71526 & & \\
 500682 & 65374.764 & \\
 \hline
 5115,968676 & & \\
 71.526 & & \\
 \hline
 30695812056 & & \\
 10231937352 & & \\
 25579843380 & & \\
 5115968676 & & \\
 35811780732 & & \\
 \hline
 365924,775519576 = 888 & & \\
 65374.764 = cg & & \\
 -431259,539519576 & & \\
 \hline
 \end{array}$$

Theorema  $x = \frac{d + bgg - 888 - cg}{388 + c - 2bg}$

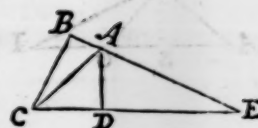
$$\begin{array}{rcl}
 888 = 13872 & 2b = 130 & \\
 c = +914 & g = 68 & \\
 \hline
 388 + c = 14786 & 1040 & \\
 2bg = -8840 & 780 & \\
 \hline
 +5946 & -8840 & \\
 \hline
 88 = 5155.24 & 388 = 15465.72 & \\
 b = 65 & c = +914 & \\
 \hline
 2577620 & 71.8 & +16379.72 = 388 + c \\
 3093144 & 130 & -9334 = 2bg \\
 \hline
 335090.60 & 21540 & +7045.72 \\
 d = 98746 & 718 & \\
 \hline
 +433836.60 & -9334.0 & \\
 -435771.432 & & \\
 \hline
 7046) -1934,832 (-274 = x & & \\
 14092 & & \\
 \hline
 52563 & & \\
 49322 & & \\
 \hline
 32412 & & \\
 \hline
 88 = 5115,968676 & 388 = 15347.91 & \\
 b = 65 & c = 914 & \\
 \hline
 25579843380 & +16261.91 & \\
 30695812056 & 2bg = -9298.38 & \\
 \hline
 332537,963940 & 6963.53 & \\
 +98746 = d & & \\
 \hline
 +431283,963940 & & \\
 -431299,539519576 & & \\
 \hline
 6963,53) -15,575579576 (-,0022367 = x & & \\
 1392706 & & \\
 \hline
 1648519 & & \\
 1392706 & & \\
 \hline
 2558135 & & \\
 2089059 & & \\
 \hline
 4690767 & & \\
 4178119 & & \\
 \hline
 5126496 & & \\
 \hline
 71,5260000 & & \\
 -,0022367 & & \\
 \hline
 a = 71,5237633 \text{ Q. E. I.} & &
 \end{array}$$

P R O.

# PROBLEMA XIX.

23

Biquadraticarum Aequationum Solutio.  
In Triangulo Obliquangulo CAE, Perpendicularis  
AD Cadit intra, perpendicularis vero CB Cadit extra  
Triangulum.



Dantur  $\begin{cases} DE \ 97 = d \\ CB \ 68 = s \\ BA \ 51 = b \end{cases}$  Quæritur perpendic. AD = a?

Aequatio erit  $aaaa + dd - bb \} aa + 2dsa = dds.$

Numeris  $aaaa + 6808aa + 672792a = 43507216.$

Sit  $aaaa + caa + da = f$

Theor.  $x = \frac{f - \frac{ggg + cg + d \times g}{488 + 2c \times g + d}}{488 + 2c \times g + d}$

$\begin{array}{r} 4 = g \\ 64 = ggg \\ 272 = cg \\ 672 = d \\ \hline 1008 \\ 4 = g \\ \hline -4032 \\ 4350 = f \\ \hline 1472 + 318(+2) = \end{array}$	$\begin{array}{r} 68 = c \\ 4 = g \\ \hline 272 \\ 64 = 488 \\ 136 = 2c \\ \hline 200 \\ 4 \\ \hline 800 \\ 672 = d \\ \hline 1472 \end{array}$	$\begin{array}{r} 42 = g \\ 42 \\ \hline 84 \\ 168 \\ \hline 1764 = gg \\ 42 \\ \hline 3528 \\ 7056 \\ \hline 74088 = ggg \\ 285936 = cg \\ 672792 = d \\ \hline 1032816 \\ 42 \\ \hline 2065632 \\ 4131264 \\ -43378272 \\ 43507216 = f \end{array}$	$\begin{array}{r} 6808 = c \\ 42 = g \\ \hline 13616 \\ 27232 \\ \hline 285936 \\ 7056 = 488 \\ 13616 = 2c \\ \hline 20672 \\ 42 \\ \hline 41344 \\ 82688 \\ \hline 868224 \\ 672792 = d \\ \hline 1541016 \end{array}$	$\begin{array}{r} 42,000 \\ +,083 \\ \hline 42,083 = g \\ 42,083 \\ \hline 126249 \\ 336664 \\ 841660 \\ 168332 \\ \hline 1770,978889 = gg \\ 42,083 \\ \hline 5312936667 \\ 14167831112 \\ 35419577780 \\ 7083915555 \\ \hline 74578,104585787 = ggg \\ 286501,064 = cg \\ 672792, = d \\ \hline 1033821,168585787 \\ 42,083 = g \\ \hline 3101463505757361 \\ 8270569348686296 \\ 20676423371715740 \\ 4135284674343148 \\ \hline -43506296,237595674321 \\ 43507216, = f \\ \hline 1543906,5463(+919,762404325679(+55574=x) \end{array}$
$1541016) + 128944,00(+,083 = x$				$1033821,168585787$
$\begin{array}{r} 7083,915556 = 488 \\ 13616, = 2c \\ \hline 20699,915556 \\ 42,083 = g \\ \hline 62099746668 \\ 165599324448 \\ 413998311120 \\ 82799662224 \\ \hline 871114,546343148 \\ 672792, = d \\ \hline 1543906,546343148 \end{array}$				$\begin{array}{r} 42,083 \\ +,00059574 \\ \hline a = 42,08359574 \text{ Q. E. I.} \end{array}$

D 2

P R O

## Biquadraticarum Aequationum Solutio.

## PROBLEMA. XX.

In Triangulo plano ABI, Angulus ABI Obtusus est  
 Angulus ABO Rectus.



Dantur  $\begin{cases} AB + AI = 51 \\ BO \text{ Perpendic. ad } AB = 21 \\ BI = 32 \end{cases}$  Queritur  $AB = a?$

Ex B dimitte perpendiculum BS, tunc  $\frac{AI^2 + AB^2 - BI^2}{2AI}$  dat AS.

Et  $\sqrt{AB^2 + BO^2} : AB :: AB : AS$  hinc Aequatio Numerofa

$$-80722222 + 501636222 - 985692122 + 1418732222 = 1096735689$$

$$-2222 + 2222 - 222 + 22 = f$$

Et Divisione Facta  $-2222 + 62,145222 - 1221,12522 + 17575,9697720512 = 135869,138875123885$

$1 = g$	$6 = bgg$	$10$	$1221 = c$
$12 = cg$	$17 = d$	$4$	$14$
$13$	$18$	$14 = g$	$4884$
$-23$	$1$	$14$	$1221$
$-10$	$18$	$56$	$17094 = cg$
$1$	$-28$	$14$	
$-10$	$-10$	$196$	$186$
$13 = f$	$17 = d$	$14$	$14$
		$784$	$744$
		$196$	$186$

$7) + 30(4 = x \quad 7$

$28$

$2744 = 888 \quad 2604 = 3bg$

$17094 = cg$

$2 \quad 1400 \quad + 19838$

$-29 = x$

$1371 = g \text{ vel sit } 137 = g$

$186,3 = 3b$

$137$

$13011$

$5589$

$1863$

$2552,31 = 3bg$

$-3193,00$

$-640,69$

$13,7$

$448483$

$192207$

$64069$

$-8777,453$

$17575,969 = d$

$-9930,821$

$13,7$

$+ 8758,516$

$69515747$

$29792463$

$9930821$

$-136052,2477$

$135869,1388 = f$

$+ 8758,516$

$-183,10890 (-208 = x$

$17597032$

$71385800$

$x = f + 222 + cg - bgg - d \times g$

$d + 3bg - 488 - 2c \times g$

$196 = gg$

$62 = b$

$392$

$1176$

$12152 = bgg$

$17575 = d$

$-29727$

$19838$

$-9889$

$14$

$39556$

$9889$

$-138446$

$135869 = f$

$2488$

$622$

$+ 8867) - 25770(-29 = x - 8708$

$17734$

$80360$

$79803$

$557$

$17575 = d$

$+ 8857$

$1221,12$

$13,7$

$854784$

$366335$

$122112$

$16729,344 = cg$

$11655,549$

$17575,969 = d$

$-29231,518$

$13,7000$

$-0,0208$

$a = 13,6792 \text{ prop.}$

P R O.

# PROBLEMA XXI.

Propōnatur Aequatio.

(b) (c) (d) (f)

$$-aaaa + 8oaaa - 19,98,aa + 14,937,a = 5000,$$

$$\begin{array}{r} 1 = g \\ 19 = cg \\ 20 \\ -22 \\ -2 \\ 1 \\ -4) -25 = x \\ 24 = 3b \\ 15 = g \\ 120 \\ 24 \\ 3600 = 3bg \\ -4896 \\ -1296 \\ 15 \\ 6480 \\ 1296 \\ -19440 \\ 14937 = d \\ -4503 \\ 650,2500 = 488 \\ 3996 = 2c \\ -4646,2500 \\ 162,5625 \\ 12,75 \\ 8128125 \\ 11379375 \\ 3251250 \\ 1625625 \\ 2072671875 = 888 \\ 2547450 = cg \\ 27547171875 \\ -27942 \\ -394828125 \\ 1275 \\ 1974140625 \\ 2763796875 \\ 789656250 \\ 394828125 \\ -503405859375 \\ 5000 = f \\ -52876) -34,05859375 (+6441 = x \end{array}$$

$$Theor. x = f + 888 + cg - bbg - d \times g$$

$$\begin{array}{r} d + 3bg - 488 - 2c \times g \\ 15 \\ -2,5 \\ 12,5 = g \text{ vel potius } 12 = g \\ 240 = 3b \\ 12 = g \\ 480 \\ 24 \\ 2880 \\ 488 = 576 \\ 2c = 3996 \\ -4572 \\ -1692 \\ 12 \\ 3384 \\ 1692 \\ -20304 - 5367) -40360 (75 = x \\ 14937 \\ -5367 \\ 38,25 \\ 80 \\ 1998 \\ 1275 \\ 9950 \\ 13986 \\ 3956 \\ 1998 \\ 2547450 = cg \\ 162,5625 = gg \\ 130050000 = bbg \\ 14937 = d \\ -27942 \\ 1275 \\ +.006441 \\ a = 12,7,6441 = g \end{array}$$

Exactiorem Calculum (Siquis desiderat)  
pagina sequens exhibebit.

P R O-



## Operatio Problematis præcedentis Continuata.

$$13018,142958918480 = \text{bgg}$$

$$14937 = d$$

$$12,756441 = e$$

$$12,756441$$

$$-27955,142958918480$$

$$12756441$$

$$51025764$$

$$51025764$$

$$76538646$$

$$63782205$$

$$89295087$$

$$25512882$$

$$12756441$$

$$12,756441$$

$$240$$

$$51025764$$

$$25512882$$

$$3061,545840 = 3bg$$

$$162,726786986481 = gg$$

$$12,756441$$

$$162726786986481$$

$$650907147945924$$

$$650907147945924$$

$$976360721918886$$

$$813633934932405$$

$$1139087508905367$$

$$325453573972962$$

$$162726786986481$$

$$ggg = 2075,814657312612674121$$

$$25487,369118 = cg$$

$$27563,183775312612674121$$

$$-27955,142958918480$$

$$-391,959183605867325879$$

$$12,756441$$

$$391959183605867325879$$

$$1567836734423469303516$$

$$1567836734423469303516$$

$$2351755101635203955274$$

$$1959795918029336629395$$

$$2743714285241071281153$$

$$783918367211734651758$$

$$391959183605867325879$$

$$-5000,004200078413796403236639$$

$$5000 = f$$

$$-5286,568) - .004200078413796403236639 ( \begin{matrix} 12,756441 \\ + 00000079448111 \end{matrix} \text{Quotiens}$$

$$a = 12,75644179448111 \text{ Q. E. I.}$$

$$12,756441$$

$$1998$$

$$102051528$$

$$114807969$$

$$114807969$$

$$12756441$$

$$35487,369118 = cg$$

$$488 = 650,907147945924$$

$$2c = 3996$$

$$-4646,907147945924$$

$$3061,545840 = 3bg$$

$$-1585,361307945924$$

$$12,756441$$

$$1585361207945924$$

$$6341445231783696$$

$$6341445231783696$$

$$9512167847675544$$

$$7926806539729620$$

$$11097529155621468$$

$$3170722615891848$$

$$1585361307945924$$

$$-20223,567988495010696484$$

$$14937 = d$$

$$-5286,568$$

P R O.



## PROBLEMA. XXI.

Solvenda Proponatur *Æquatio*.

$$-aaaa + 323609,663689aa + 4228931,085087852a + 22540483202,613561987516.$$

$$\text{Sit } -aaaa + caa + da = f$$

$$\text{Theor. } x = \frac{f + \overline{ggg} - cg - d \times g}{d + 2c - 48g \times g}$$

Sumatur  $-aaaa + 32aa + 4a = 225$  pro prima parte (g) Invenienda.

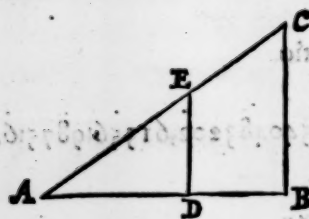
Sit $5 = g$	$32 = c$	$25 = gg$	$3236 = c$	
$+ 125 = ggg$	$5 = g$	$4$	$48 = g$	
$- 164$	$160$	$- 100 = 4gg$	$25888$	$- 9216 = 48g$
$- 39$	$4 = d$	$+ 64 = 2c$	$12944$	$+ 6472 = 2c$
$5 = g$	$- 164$	$- 36$	$155328 = cg$	$- 2744$
$- 195$		$5 = g$	$4228 = d$	$48 = g$
$+ 225 = f$		$- 180$	$- 159556$	$21952$
$- 176$		$+ 4 = d$	$+ 110592 = ggg$	$10976$
$+ 30,0$		$- 176$	$- 48964$	$- 131712$
$480$	$323609 = c$		$48 = g$	$+ 4228 = d$
$+ 7$	$487 = g$			$- 127484$
$487 = g$	$2265263$	$18432$	$391712$	
$487$	$2588872$	$9216$	$195856$	
$3409$	$1294436$	$110592 = ggg$	$- 2350272$	
$3896$	$157597583$		$+ 2254048 = f$	
$1948$	$4228931 = d$		$- 127484$	$- 96224,0$
$237169 = gg$	$- 161826514$			$+ 7 = x$
$487$	$+ 115501303 = ggg$	$- 948676 = 48g$	$487,000$	
$1660183$	$- 46325211$	$+ 647218 = 2c$	$+ 1,139$	
$1897352$	$487 = g$	$- 301458$	$487,139 = g$	
$948676$	$324276477$	$487 = g$	$487,139$	
$115501303 = ggg$	$370601688$	$2110206$	$237304405321 = gg$	
	$185300844$	$2411664$	$487,139 = g$	
	$- 22560377757$	$1205832$	$115600230,70366619 = ggg$	
	$+ 22540483202 = f$	$- 145810046$		
$- 142581115$	$- 19894555,0$	$+ 4228931 = d$		
	$323609,663689 = c$	$- 142581115$	$- 549287,621284 = 48g$	
	$487,139 = g$		$+ 647219,327378 = 2c$	
	$157642887,759795771 = cg$		$301998,293506$	
	$4228931,085087852 = d$		$487,139 = g$	
	$- 161871818,844883623$		$- 147115146,895074934$	
	$+ 115600230,70366619 = ggg$		$+ 4228931,085087852 = d$	
	$- 45271588,141217004$		$- 142886215,809587082$	
	$487,139 = g$			
	$- 22540695175,524310111555$	$487,139$		
	$+ 22540483202,613561987516 = f$	$(+ 0,00148351$		
$- 142886215,8095871$	$- 21197,2910748124040$	$) = 487,14048351$		

$$a = 487,14048351 \text{ Q. E. I.}$$

P R C.

## P R O B L E M A. XXIII.

Triangula ADE, ABC sint Rectangula



Denturque  $\begin{cases} AD = b = 20 \\ CB = d = 24 \\ EC = c = 15 \end{cases}$  Quæritur  $DB = a$ ?

Æquatio  $\begin{cases} +aaaa + 2baaa + dd \\ +bb \\ -cc \end{cases} aa - 2bcc = bbcc$

(b) (c) (d) (f.)

Numeris  $+aaaa + 40aaa + 751aa - 9000a = 90000$ .

$1 = g$

$9 = d$	$4 = 4gg$	$10$	$751$
$-1 = ggg$	$12 = 3bg$	$+2$	$12$
$-4 = bgg$	$14 = 2c$		
$-7 = cg$			$1502$
	$30$	$144 = 88$	$751$
$-12$	$-9 = d$	$12$	
	$21$		$9012 = cg$
$-3$		$288$	
$1$		$144$	
		$-1728 = 88g$	
$-3$		$-5760 = bgg$	
$9 = f$		$-9012 = cg$	
$31) + 6,0 (+2 = x$		$-16500$	
		$9000 = d$	
		$-7500$	
		$12$	
		$15000$	
		$7500$	
		$-90000$	
		$+90000 = f$	
		$00000$ nil restat ergo	
		$g = a = 12$ Q. E. I.	

Quò autem clarius appareat

Universalitas nostræ methodi. Sit  $g = 13$ 

$169$	$676 = 4gg$	$13$
$40$	$1560 = 3bg$	$39$
	$1502 = 2c$	$13$
$6760$		$169 = 88$
	$3738$	$13$
$751$	$13$	$507$
$13$		$169$
	$11214$	$2197 = 88g$
$2253$	$3738$	$6760 = bgg$
$751$		$9763 = cg$
$9763$	$48594$	$-18720$
	$-9000 = d$	$9000 = d$
$13$		$-9720$
$120$	$39594$	$13$
$1560$		$29160$
		$9720$
		$-126360$
		$90000$
		$39594 - 363600 (-91 = x$
		$555986$
		$076140$

Theor.  $x = f + d - cg - bgg - 88g \times g$

$488 + 3bg + 2c \times g - d$

$1300$
$-91$
$1209 = g$
$1209$
$10881 = gg$
$24180$
$1209$
$1461681 = gg$
$1209$
$13155129$
$29233620$
$1461681$
$1767172329 = 88g$
$5846724 = bgg$
$907959 = cg$
$16693486329$
$9000 = d$
$-7693486329$
$1209 = g$
$69241376961$
$153869726580$
$7693486329$
$-93014,24971761$
$90000 = f$

$+33768) - 301424971761 (-8926 = x$

$584,6724 = 488$   
 $1450,8000 = 3bg$   
 $1502 = 2c$

$35374724$   
 $1209 = g$

$318372516$   
 $707494480$   
 $35374724$   
 $42768041316$   
 $9000 = d$   
 $33768.041316$

$1209$   
 $-08926$

$a = 12,00074$   
 Q. E. I.

P R O.

P R O B L E M A. XXIV.  
Æquationum quintæ potestatis Adfectarum Solutio.

Proponatur ... —aaaa + 7aaaa — 20aaa + 155aa = 10000

Hoc est —aaaa + baaaa — caaa + daa = f.

$$\text{Theo. } x = \frac{f + 8888 + c888 - b888 - d88}{4b888 + 2dg - 58888 - 3c88}$$

$\begin{array}{r} -5 = g \quad 125 \quad 155 \quad -125 \quad 310 \\ \hline -125 \quad 5 \quad 25 \quad 20 \quad -5 \\ \hline 25 \quad 625 \quad 775 \quad -2500 \quad -1550 \\ \hline 625 \quad 7 \quad 310 \quad 625 \quad 25 \\ \hline 250 \quad 4375 \quad 3875 \quad 5 \quad 60 \\ \hline -3125 = 88888 \\ -2500 = c888 \\ -4375 = b8888 \\ -3875 = d88 \\ \hline -13875 \\ +10000 = f \\ \hline -9675 - 38750 (+ 54 = x) \end{array}$	$\begin{array}{r} 125 \quad 28 \quad -50 \quad -34 \\ \hline -3500 = 4b888 \quad -4.6 = g \\ -1550 = 2dg \quad -4.6 \\ -3125 = 58888 \\ -1500 = 3c88 \quad 276 \\ \hline -9675 \quad 184 \\ \hline +21.16 = 88 \\ -4.6 \\ \hline 12696 \\ 8464 \\ \hline -97.335 = 888 \\ 4.6 \\ \hline 584016 \\ 389344 \\ \hline +447.7456 = 8888 \\ 4.6 \quad 4b888 = 2725.408 \\ \hline 26864736 \quad 2dg = 1426.000 \\ 17909824 \quad 58888 = 2238.728 \\ \hline -2059.62976 = 88888 \quad 3c88 = 1269.600 \\ -1946.72000 = c888 \\ -3134.21920 = b8888 \\ -3279.80000 = d88 \\ \hline -10420.36896 \\ +10000 = f \\ \hline -7659 - 420.36896 (+ 555) \end{array}$	$\begin{array}{r} 888 = 97.335 \\ c = 20 \\ \hline 1946.720 \\ \hline 88 = 21.16 \\ d = 155 \\ \hline 10530 \\ 10580 \\ 2116 \\ \hline 327980 \\ \hline 888 = 97.335 \\ 4b = 28 \\ \hline 778688 \\ 194672 \\ \hline 4b888 = 2725.408 \\ 2dg = 1426.000 \\ 58888 = 2238.728 \\ 3c88 = 1269.600 \\ \hline -7659.736 \end{array}$
$\begin{array}{r} -4545 = g \\ 310 = 2d \\ \hline 45450 \\ 13535 \\ \hline -1408.950 \end{array}$	$\begin{array}{r} 22725 \quad 18180 \\ \hline 22725 \quad 18180 \\ \hline +20657025 = 88 \\ 4545 \\ \hline 103285125 \quad 82628100 \\ 103285125 \quad 82628100 \\ \hline -93.886178625 = 888 \\ -4.545 \\ \hline 469430893125 \quad 375544714500 \\ 469430893125 \quad 375544714500 \\ \hline +426.712681850625 = 8888 \\ 4545 \\ \hline 2133563409253125 \quad 1706850727402500 \\ 2133563409253125 \quad 1706850727402500 \\ \hline -1539.409139011090625 = 88888 \\ -1877.723572500 = c888 \\ -2986.988772954375 = b8888 \\ -3201.838875 = d88 \\ \hline 10005.960359465465625 \\ +10000 = f \\ \hline -7410.748 - 5.960359465465625 (+ 50080428 = x) \end{array}$	$\begin{array}{r} 20657025 = 88 \\ 155 = d \\ \hline 10325125 \quad 103285125 \\ \hline 20657025 \\ \hline -3201.838875 = d88 \\ -93.886178625 = 888 \\ 28 = 4b \\ \hline 751089429000 \quad 187772357250 \\ \hline -2628.813001500 = 4b8 \\ -1408.950 = 2dg \\ -2133.563409253 = 58 \\ -1239.421500 = 3c88 \\ \hline -7410.747910753 \end{array}$

E

P R O.

## PROBLEMA. XXV.

Quinqui-Sectio Anguli.

Datur { Radius Circuli = 1 } Quæritur Chorda 12 gr. quæ est  
 { Chorda Arcus 60 gr. = 1 = b } Quintæ partis Arcus.

$$\text{Æquatio } -aaaa - caaa + fa = h$$

$$\text{Numeris } aaaaa - 5aaa + 5a = 1$$

$$\text{Theor. x} = \frac{h + ceee - eeeee - fg}{f + seeee - 3cgg}$$

$$\begin{array}{r} \text{Sit, 2 = g} \\ \text{.2} \\ \hline .04 = gg \\ \text{.2} \\ \hline .008 = ggg \\ \text{.2} \\ \hline .0016 = gggg \\ \text{.2} \\ \hline .00032 = ggggg \\ \text{1.0 = fg} \\ \hline -1.00032 \\ +1.040 = cggg+h \\ \hline 4.408 + .03568 (+1.008 = x) \\ \hline .043264 = gg \\ \text{15 = 3c} \\ \hline 216320 \\ 43264 \\ \hline -648960 \\ \hline .008998912 = ggg \\ \text{.208} \\ \hline 71991296 \\ 179978240 \\ \hline .001871773696 = gggg \\ \text{.208} \\ \hline 14974189568 \\ 37435473920 \\ \hline .000389328928768 = ggggg \\ \text{1.040 = fg} \\ \hline -1.040389328928768 \\ +1.044094560 = cggg+h \\ \hline +4.36039887 + .004605231071232 (+1.00105 = x) \\ \hline 435039887 \\ \hline 2448322012 \end{array}$$

$$\begin{array}{r} .009358868480 = f + seeee \\ -648960 = 3cgg \\ \hline +4.360398868480 \end{array}$$

$$\begin{array}{r} .0437019025 = gg \\ \text{15 = 3c} \\ \hline 2185095125 \\ 437019025 \\ \hline .6555285375 \end{array}$$

$$\begin{array}{r} +5.00954928141059753125 = f + seeee \\ -6555285375 = 3cgg \\ \hline 4.35402074391059753125 \end{array}$$

$$\begin{array}{r} .208 \\ +.105 \\ \hline .20905 = g \\ .20905 \end{array}$$

$$\begin{array}{r} 104525 \\ 1881450 \\ \hline 418100 \end{array}$$

$$\begin{array}{r} .0437019025 = gg \\ .20905 \end{array}$$

$$\begin{array}{r} 2185095125 \\ 39331712250 \\ \hline 8740380500 \end{array}$$

$$\begin{array}{r} .009135882717625 = ggg \\ .20905 \end{array}$$

$$\begin{array}{r} 4567941358125 \\ 822229444586250 \\ \hline 182717654352500 \end{array}$$

$$\begin{array}{r} .00190985628211950625 = gggg \\ .20905 \end{array}$$

$$\begin{array}{r} 954928141059753125 \\ 17188706539075556250 \\ \hline 3819712564239012500 \end{array}$$

$$\begin{array}{r} .0003992554557770827815625 = ggggg \\ 1.04525 = fg \end{array}$$

$$\begin{array}{r} -1.0456497554557770827815625 \\ +1.045679413588125 = h + cggg \end{array}$$

$$\begin{array}{r} (65 = x) \\ +4.3540207439 + .0000301581323479172184375 (+.00000692) \\ \hline 261241244634 \end{array}$$

$$\begin{array}{r} 403400788451 \\ 391861866951 \end{array}$$

$$\begin{array}{r} .20905 \\ +.0000069265 \end{array}$$

$$\begin{array}{r} 115389215007 \\ 87080414878 \end{array} \quad \begin{array}{r} 2 = .2090569265 \\ \hline Q. E. I. \end{array}$$

$$\begin{array}{r} 283098001292 \\ 261241244634 \end{array}$$

$$\begin{array}{r} 218567566581 \\ 217701037195 \end{array}$$

$$866529386$$

PRO-

PROBLEMA. XXVI.

*Æquationum Affectarum Sextæ Potestatis Solutio.*

Proponatur Aequatio aaaaaa —daaa + f a = b

Numeris aaaaaa — 5aaa + 5a = 1,5 ; Quæritur a ?

$$\text{Theorema } x = \frac{h + dggg - gggggg - fg}{6ggggg + f - 3dgg}$$

Sir 33 = g	33 = g	179685 = dg <sup>1</sup>	3300
33	33	1,5 = h	+3,00837
135 = dgg	99 = gg		
1,5 = h	33	99	33837 = g
	33	99	33837
1,635	3027 = g <sup>1</sup>	1089 = gg	236859
	33	33	101511
+5,01458 = 6g <sup>1</sup> + f	0081 = g <sup>1</sup>	3267	270696
-1,35000 = 3dgg	33	3207	101511
			101511
3,66458	00243 = g <sup>1</sup>	035937 = g <sup>1</sup>	1144942569 = gg
	33	33	33837
	000729 = g <sup>1</sup>	107811	8014597983
1,5 = f g		107811	3434827707
			9159540552
-1,500729	01185921 = g <sup>1</sup>		3434827707
+1,635 = dg <sup>1</sup> + h	33		3434827707
+3,66458) +1,34271( +03 = 3557763	3557763		038741421707253 = gg
			33837
1089 = gg	0039135393 = g <sup>1</sup>		
15 = 3d	33		271189951950771
			116224265121759
5445			309931373658024
1089	117406179		116224265121759
	117406179		116224265121759
-1,6335 = 3dgg			
+5,02348124 = 6g <sup>1</sup> + f	001291467969 = g <sup>1</sup>		01310893486308319761 = gg
	1,65 = f g		33837
+3,38998124			
	-1,651291467969		9176254404158238327
	+1,679685 = h + dg <sup>1</sup>		3932680458924959283
+3,38998) +028393532031( +00837 = 2711984			10487147800466558088
			3932680458924959283
			3932680458924959283
1,5 = h			
19370710 <sup>1</sup> 536265 = dg <sup>1</sup>	1273692		0044356702896214615752957 = gg
	1016994		33837
1,693707108536265 = dg <sup>1</sup> + h			
	2566980		
+5,02661402173772876945 = 6g <sup>1</sup> + f			310456920273502310270699
-1,7174138535 = 3dgg			193070108688643847258871
			551853623169716926023656
+3,30520016823772876945			133070108688643847288871
			133070108688643847258871
338370000			001500897755899213953232806009 = g <sup>1</sup>
+000107642 = x			1,69185 = f g
338477642 Q. E. J.			-1,693350897755899213953232806009
			+1,693707108536265 = h + dgg
			+3,30520017) +000356210780365786046767193991( +000107642 = x



## PROBLEM A. XXVII.

Æquationum Adfectarum Septimæ Potestatis Resolutio.

Proponatur Æquatio pro Anguli Septi-Sectione — aaaaaa + caaaaa — daaa + ha = i  
 Numeris — aaaaaa + 7aaaa — 14aaa + 7a = 1,5

$$\begin{array}{r}
 .008 = g^3 \\
 14 = d \\
 .112 \\
 .00032 = g^5 \\
 7 = c \\
 .00224 \\
 14 = hg \\
 .140224 \\
 42 = 3d \\
 .04 = g^2 \\
 1,68 \\
 cg^2 = .000448 \\
 .112 = d g^3 \\
 -1,680448 + 1,6120128 \\
 +7,0550 - 1,40224 \\
 +5,7555 + 2,097728 (+,03) = x \\
 .23 = g \\
 7 = h \\
 1,61 \\
 .0045054401 \\
 1,61 = hg \\
 1,6145054401 \\
 .0034014848450625 = g^4 \\
 35 = 5c \\
 170074242253125 \\
 102044515351875 \\
 7,115051905371875 = 5c g^4 + h \\
 .05832225 = g^2 \\
 42 = 3d \\
 11654450 \\
 2328900 \\
 2,4495345000000 \\
 .0013886757455 = 7g^5 \\
 -2,45092317574650 \\
 +7,11505106957710 \\
 4,6681237533069
 \end{array}$$

$$Theor. x = \frac{i + g^7 + dg^1 - cg^5 - hg}{5cg^4 + h - 7g^5 - 3dgg}$$

$$\begin{array}{r}
 .00279841 = g^4 \\
 35 = 5c \\
 1399205 \\
 839523 \\
 7,09794435 = 5cg^4 + h \\
 .0529 = g^2 \\
 42 = 3d \\
 1058 \\
 2116 \\
 2,2218 \\
 .00103625 = 7g^5 \\
 -2,22283625 \\
 +7,09794435 \\
 +4,87510810 \\
 .00279841 = g^4 \\
 .23 \\
 839523 \\
 559682 \\
 .0006436343 = g^5 \\
 .23 \\
 19309029 \\
 12872686 \\
 .000148035889 = g^5 \\
 .23 \\
 444107667 \\
 256071778 \\
 1,50003404825447 = g^7 + i \\
 .170338 = dg^3 \\
 +1,67037204825447 \\
 -1,6145054401 \\
 +4,8751 + .05526660815447 (+,0115) = x \\
 .014084823375 = g^3 \\
 14 = d \\
 .056339293500 \\
 14084823375 \\
 197187527250 \\
 .2415 = g \\
 7 = h \\
 1,6905 = hg \\
 .2415 \\
 +,00021105 = x \\
 a = 2,4171105. Q. E. I.
 \end{array}$$

$$4,66812879383069 + .0009852264326772833033359375 (+,00021105) = x$$

P R O.



## PROBLEMA. XXVIII.

Proponatur Solvenda *Æquatio*,  $aa + ba = c$ , a quolibet  
Numero Radici non proximo. E. g. ab unitate.

Numeris  $aa + 5a = 664$  Theor.  $x = \frac{c - gg - bg}{2g + b}$

$+1 = g$ primz $+91$	$1 = g$ $1 = gg$ $5 = bg$	$92 = g$ $92$ $184$ $828$	$49 = g$ $49$ $441$ $196$
$+92 = g$ 2dz $-43$	$2g = 2$ $b = 5$ $+646 = c$	$8464 = gg$ $460 = bg$	$2401 = gg$ $245 = bg$
$+49 = g$ 3tiz $-19$	$+7) +640 (+91 = x$ $53$ $10$	$2g = 184$ $b = 5$ $+646 = c$	$2546$ $+646 = c$
$+30 = g$ 4tiz $-6$	$30 = g$ $30$ $900 = gg$ $150 = bg$	$+189) -8278 (-43 = x$ $756$ $718$	$2g = 93$ $b = 5$ $+103) -2000 (-19 = x$
$+24 = g$ 5tiz $-0,9$	$2g = 60$ $b = 5$ $+646 = c$	$24 = g$ $24$ $96$ $48$	$23,1 = g$ $23,1$ $231$ $693$ $462$
$23, 1 = g$ 6tiz $-0,0608$	$+65) -404 (-6 = x$	$576 = gg$ $120 = bg$	$533,61 = gg$ $115,50 = bg$
$23,0392$ &c. Q.E.I.	$2g = 48$ $b = 5$ $+646 = c$	$+53) -50,0 (-9 = x$	$2g = 46,2$ $b = 5$ $+646,11 = c$
			$51,2) -3,11000 (-0,0608 = x$

## PROBLEMA. XXIX.

Proponatur  $ba - aaa = c$   
Numeris.  $1000a - aaa = 174$  } Theor.  $x = \frac{c + gg - bg}{b - 3gg}$

$+1 = g$ primz $-0,8$	$1 = g$ $1 = gg$ $174 = c$	$32 = g$ $32$ $104 = gg$ $32$
$+2 = g$ 2dz $-0,26$	$b = 1000$ $388 = 3$ $+175$ $-1000$	$3008 = gg$ $174,000 = c$
$+174 = g$ 3tiz	$+997) -825,0 (-8 = x$	$b = 1000,00$ $388 = 12$ $+174,008$ $-200,000 = bg$
$23,174$ &c. Q. E. I.		$+999,88) -25,9920 (-0,26 = x$

(E)

PRO.

## PROBLEMA. XXX.

Proponatur  $aaa + ba = c$ Numeris  $aaa + 5a = 646$ , in qua tota simul Radix (a) Converget. Theor.  $a = \frac{c+gg}{2g+b}$ 

+1 = a primæ  
 92 = a 2dæ  
 48 = a 3tiæ  
 29 = a 4tiæ  
 23 = a 5tiæ

23,04 &amp;c. a = Q. E. I.

1 = g  
 2g = 2 1 = gg  
 b = 5 646 = c  
 7) 647/92 = a vel g  
 63 92

184  
 828  
 2g = 184 8464 = gg  
 b = 5 646 = c

189) 9110 (48 = a vel g  
 756 48  
 1550 384  
 192

2g = 96 2304 = gg  
 b = 5 646 = c

101) 2950 (29 = a vel g  
 202

930

29 = g

29

261

58

2g = 58 841 = gg  
 b = 5 646 = c

63) 1487 (23 = a vel g  
 126 23

227 69  
 46

2g = 46 529 = gg  
 b = 5 646 = c

51) 1175 (23,04 = a  
 102

155  
 153

200

## PROBLEMA. XXXI.

Proponatur  $aaa - ba = c$ Numeris  $aaa - 430a = 231$ Theor.  $a = \frac{c+2gg}{3gg-b}$ 

+1 = a primæ

-0,5 = a 2dæ

-0,53 = a 3tiæ

-0,5375 &amp;c. = a

Q. E. I.

1 = g

1 = gg

1 = ggg

2

3gg = +3 2 = 2ggg  
 b = -430 231 = c

-427) +233,0 (-,5 = a vel g  
 -,5

+25 = gg  
 ,5

-,125 = ggg  
 2

3gg = +0,75 -250 = 2ggg  
 b = -430,00 +231,000 = c

-429,25) +230,750 (-,53 = a  
 214625

161250

-,53 = a vel g

-,53

159

265

+2809 = gg

-,53

8627

14045

-,148877 = ggg

2

3gg = +8427 -297754 = 2ggg  
 b = -430,0000 +231,000000 = c

-429,1573) +230,702246 (-,5375 = a  
 21457865

16123596

12874719

32488770

30041011

24477590

Si ponatur  $20 = g$ , eruntur  $21 =$  Radici alteri.

PRO.

## PROBLEMA. XXXII.

Proponatur Aequatio Biquadratica.  $aaaa - baa + ca = d$ Numeris.  $aaaa - 5aa + 7a = 291$ . quæ aNumero Radici proximo Convergat. *Theor.*  $a = \frac{d + 32222 - b22}{4222 + c - 2b22}$ 

Sit. $5 = a$ vel $g$		$4.4 = g$	
<u>5</u>		<u>4.4</u>	
$25 = gg$		<u>176</u>	
<u>5</u>		<u>176</u>	
$125 = g^3$		$19,36 = g^4$	
<u>5</u>		<u>4.4</u>	
$625 = g^5$		<u>7744</u>	
<u>3</u>		<u>7744</u>	
$4g^3 = 500$		$85,184 = g^3$	
$c = 7$		<u>4.4</u>	
$+507$	$+2166$	<u>340736</u>	$4.341 = g$
$2bg = -50$	$-125 = bgg$	<u>340736</u>	<u>4.341</u>
$+457$	$+2041,0 (+4.4 = a$	$374,8096 = g^4$	<u>4341</u>
	<u>1828</u>	<u>3</u>	<u>17364</u>
	<u>2130</u>		<u>18,844281 = gg</u>
	$4g^3 = 340,736$	$1124,4288 = 3g^4$	<u>4.341</u>
	$c = 7,000$	$291,0000 = d$	<u>18844281</u>
	$+347,736$	$+1415,4288$	<u>75377124</u>
	$2bg = -44,000$	$-96,8000 = bgg$	<u>56532843</u>
	$+303,736$	$+1318,628800 (+4,341 = a$	<u>75377124</u>
		<u>1214944</u>	$81,803023821 = g^3$
		<u>1036848</u>	<u>4.341</u>
		<u>911208</u>	$81803023821$
		<u>1256400</u>	<u>327212095284</u>
		<u>1214944</u>	<u>244409071463</u>
		<u>414560</u>	<u>327212095284</u>
			$355,106926406961 = g^4$
			<u>3</u>
	$4g^3 = 327,212095284$	$1065,3200779220883 = 3g^4$	
	$c = 7,000000000$	$291,000000000 = d$	
	$+334,212095284$	$+1356,320779220883$	
	$2bg = -43,410000000$	$-94,221405 = bgg$	
	<u>290,802095284</u>	$+1262,0993742208830000 (+1,3400628 = a$	

 $a = 4,4400628. \text{cc. Q. E. I.}$ 

Canones

# CANONES DIRECTORII

## Theorematis Conficiendis inservientes.

**S**equentes Canones, expeditioris praxeos gratia addidi ; Eorum usus talis est.

Data æquatione, respiciendum est ad ejusdem generis Canonem, Cujus prima Columna Theorematis dividendum secunda divisorem continet. Dividendo addatur numerus absolutus, & termini omnes disponantur contrariis (illis quæ sunt in æquatione) signis, termini vero divisoris iisdem.

Si termini aliqui in Æquatione defunt, correspondentes termini in Canone omittantur.

Si vel in Dividendo vel Divisore partes negativæ affirmatis prævalent, Mutatis omnibus Signis tum Dividendi tum Divisoris affirmatæ redduntur, quod reductione patet ; hoc tamen ad operandum non est necessarium.

Theoremata omnia ad æquationes potestatem Biquadraticam non Superantes ut maxime necessaria aptanda curavi, pro superioribus ex Canonibus facile conficiantur.

Canon

## Canon Quadratic.

$$\left. \begin{array}{l} gg \\ bg \end{array} \right\} x$$

1	$aa + ba = c$	$x = \frac{c - gg - bg}{2g + b}$	$a = \frac{c + gg}{2g + b}$
2	$aa - ba = c$	$x = \frac{c + bg - gg}{2g - b}$	$a = \frac{c + gg}{2g - b}$
3	$-aa + ba = c$	$x = \frac{c + gg - bg}{b - 2g}$	$a = \frac{c - gg}{b - 2g}$
4	$aa = c$	$x = \frac{c - gg}{2g}$	$a = \frac{c + gg}{2g}$

## Canon Cubic.

$$\left. \begin{array}{l} ggg \\ bgg \\ cg \end{array} \right\} x$$

1	$aaa = b$	$x = \frac{b - ggg}{3gg}$	$a = \frac{b + 2ggg}{3gg}$
2	$aaa + ca = d$	$x = \frac{d - ggg - cg}{3gg + c}$	$a = \frac{d + 2ggg}{3gg + c}$
3	$aaa - ca = d$	$x = \frac{d + cg - ggg}{3gg - c}$	$a = \frac{d + 2ggg}{3gg - c}$
4	$-aaa + ca = d$	$x = \frac{d + ggg - cg}{c - 3gg}$	$a = \frac{d - 2ggg}{c - 3gg}$
5	$aaa + baa = c$	$x = \frac{c - ggg - bgg}{3gg + 2bg}$	$a = \frac{c + 2ggg + bgg}{3gg + 2bg}$
6	$aaa - baa = c$	$x = \frac{c + bgg - ggg}{3gg - 2bg}$	$a = \frac{c + 2ggg - bgg}{3gg - 2bg}$
7	$-aaa + baa = c$	$x = \frac{c + ggg - bgg}{2bg - 3gg}$	$a = \frac{c + bgg - 2ggg}{2bg - 3gg}$
8	$aaa + baa + ca = d$	$x = \frac{d - ggg - bgg - cg}{3gg + 2bg + c}$	$a = \frac{d + 2ggg + bgg}{3gg + 2bg + c}$
9	$aaa - baa + ca = d$	$x = \frac{d + bgg - ggg - cg}{3gg + c - 2bg}$	$a = \frac{d + 2ggg - bgg}{3gg + c - 2bg}$
10	$aaa + baa - ca = d$	$x = \frac{d + cg - ggg - bgg}{3gg + 2bg - c}$	$a = \frac{d + 2ggg + bgg}{3gg + 2bg - c}$
11	$aaa - baa - ca = d$	$x = \frac{d + bgg - cg - ggg}{3gg - 2bg - c}$	$a = \frac{d + 2ggg - bgg}{3gg - 2bg - c}$

F

aaaa



12	$-aaa + baa + ca = d$	$x = \frac{d + 888 - b88 - c8}{2bg + c - 388}$	$a = \frac{d + b88 - 2888}{2bg + c - 388}$
13	$-aaa - baa + ca = d$	$x = \frac{d + 888 + b88 - c8}{c - 388 - 2bg}$	$a = \frac{d + 2888 - b88}{c - 388 - 2bg}$
14	$-aaa + baa - ca = d$	$x = \frac{d + 888 + c8 - b88}{2bg - 388 - c}$	$a = \frac{d + b88 - 2888}{2bg - 388 - c}$

## Canon Biquadratic.

$$\left. \begin{array}{l} 8888 \\ b888 \\ c888 \\ dg \end{array} \right\} x$$

1	$aaaa + baaa + caa + da = f$	$x = \frac{f - 8888 - b888 - c88 - dg}{4888 + 3b88 + 2c8 + d}$	$a = \frac{f + 38888 + 2b888 + c88}{4888 + 3b88 + 2c8 + d}$
2	$aaaa + baaa + caa - da = f$	$x = \frac{f - 8888 - b888 - c88 + dg}{4888 + 3b88 + 2c8 - d}$	$a = \frac{f + 38888 + 2b888 + c88}{4888 + 3b88 + 2c8 - d}$
3	$aaaa + baaa - caa - da = f$	$x = \frac{f + c88 + dg - 8888 - b888}{4888 + 3b88 - 2c8 - d}$	$a = \frac{f + 38888 + 2b888 - c88}{4888 + 3b88 - 2c8 - d}$
4	$aaaa - baaa - caa - da = f$	$x = \frac{f + b888 + c88 + dg - 8888}{4888 - 3b88 - 2c8 - d}$	$a = \frac{f + 38888 - 2b888 - c88}{4888 - 3b88 - 2c8 - d}$
5	$aaaa - baaa - caa + da = f$	$x = \frac{f + b888 + c88 - 8888 - dg}{4888 + d - 3b88 - 2c8}$	$a = \frac{f + 38888 - 2b888 - c88}{4888 + d - 3b88 - 2c8}$
6	$aaaa - baaa + caa + da = f$	$x = \frac{f + b888 - 8888 - c88 - dg}{4888 + 2c8 + d - 3b88}$	$a = \frac{f + 38888 - 2b888 - c88}{4888 + 2c8 + d - 2b88}$
7	$aaaa + baaa - caa + da = f$	$x = \frac{f + c88 - 8888 - b888 - dg}{4888 + 3b88 + d - 2c8}$	$a = \frac{f + 38888 + 2b888 - c88}{4888 + 3b88 + d - 2c8}$
8	$aaaa - baaa + caa - da = f$	$x = \frac{f + b888 + dg - 8888 - c88}{4888 + 2c8 - 3b88 - d}$	$a = \frac{f + 38888 + c88 - 2b888}{4888 + 2c8 - 3b88 - d}$
9	$-aaaa + baaa + caa + da = f$	$x = \frac{f - b888 - c88 - dg + 8888}{3b88 + 2c8 + d - 4888}$	$a = \frac{f + 2b888 + c88 - 3888}{3b88 + 2c8 + d - 4888}$
10	$-aaaa - baaa + caa + da = f$	$x = \frac{f + 8888 + b888 - c88 - dg}{2c8 + d - 4888 - 3b88}$	$a = \frac{f + c88 - 38888 - 2b888}{2c8 + d - 4888 - 3b88}$



11	$-aaaa-baaa-caa+da=f$	$x = \frac{f+gggg+bggg+cgg-dg}{d-4ggg-3bgg-2cg}$	$a = \frac{f-3gggg-2bggg-cgg}{d-4ggg-3bgg-2cg}$
12	$-aaaa+baaa-caa+da=f$	$x = \frac{f+gggg+cgg-bggg-dg}{3bgg+d-4ggg-2cg}$	$a = \frac{f+2bggg-3ggg-cgg}{3bgg+d-4ggg-2cg}$
13	$-aaaa+baaa+caa-da=f$	$x = \frac{f+gggg+dg-bggg-cgg}{3bgg+2cg-4ggg-d}$	$a = \frac{f+2bggg+cgg-3ggg}{3bgg+2cg-4ggg-d}$
14	$-aaaa-baaa+caa-da=f$	$x = \frac{f+gggg+bggg+dg-cgg}{2cg-4ggg-3bgg-d}$	$a = \frac{f+cgg-3ggg-2bggg}{2cg-4ggg-3bgg-d}$
15	$-aaaa+baaa-caa-da=f$	$x = \frac{f+gggg+cgg+dg-bggg}{3bgg-4ggg-2cg-d}$	$a = \frac{f+2bggg-3ggg-cgg}{3bgg-4ggg-2cg-d}$
16	$aaaa+caa+da=f$	$x = \frac{f-gggg-cgg-dg}{4ggg+2cg+d}$	$a = \frac{f+3ggg+cgg}{4ggg+2cg+d}$
17	$aaaa+caa-da=f$	$x = \frac{f-gggg-cgg+dg}{4ggg+2cg-d}$	$a = \frac{f+3ggg+cgg}{4ggg+2cg-d}$
18	$aaaa-caa-da=f$	$x = \frac{f-gggg+cgg+dg}{4ggg-2cg-d}$	$a = \frac{f+3ggg-cgg}{4ggg-2cg-d}$
19	$aaaa-caa+da=f$	$x = \frac{f-gggg-dg+cgg}{4ggg+d-2cg}$	$a = \frac{f+3ggg-cgg}{4ggg+d-2cg}$
20	$-aaaa+caa+da=f$	$x = \frac{f+gggg-cgg-dg}{2cg+d-4ggg}$	$a = \frac{f+cgg-3ggg}{2cg+d-4ggg}$
21	$-aaaa+caa-da=f$	$x = \frac{f+gggg+dg-cgg}{2cg-4ggg-d}$	$a = \frac{f+cgg-3ggg}{2cg-4ggg-d}$
22	$-aaaa-caa+da=f$	$x = \frac{f+gggg+cgg-dg}{d-4ggg-2cg}$	$a = \frac{f-3ggg-3ggg}{d-4ggg-2cg}$

23	$aaaa + baaa + caa = f$	$x = \frac{f - 8888 - b888 - c88}{4888 + 3b88 + 2c8}$	$a = \frac{f + 38888 + 2b888 + c88}{4888 + 3b88 + 2c8}$
24	$aaaa + baaa - caa = f$	$x = \frac{f + c88 - 8888 - b888}{4888 + 3b88 - 2c8}$	$a = \frac{f + 38888 + 2b888 - c88}{4888 + 3b88 - 2c8}$
25	$aaaa - baaa - caa = f$	$x = \frac{f + b888 + c88 - 8888}{4888 - 3b88 - 2c8}$	$a = \frac{f + 38888 - 2b888 - c88}{4888 - 3b88 - 2c8}$
26	$aaaa - baaa + caa = f$	$x = \frac{f + b888 - 8888 - c88}{4888 + 2c8 - 3b88}$	$a = \frac{f + 38888 + c88 - 2b888}{4888 + 2c8 - 3b88}$
27	$-aaaa + baaa + caa = f$	$x = \frac{f + 8888 - b888 - c88}{3b88 + 2c8 - 4888}$	$a = \frac{f + 2b888 + c88 - 38888}{3b88 + 2c8 - 4888}$
28	$-aaaa + baaa - caa = f$	$x = \frac{f + 8888 + c88 - b888}{3b88 - 4888 - 2c8}$	$a = \frac{f + 2b888 - 38888 - c88}{3b88 - 4888 - 2c8}$
29	$-aaaa - baaa + caa = f$	$x = \frac{f + 8888 + b888 - c88}{2c8 - 4888 - 3b88}$	$a = \frac{f + c88 - 3888 - 2b88}{2c8 - 4888 - 3b88}$
30	$aaaa + baaa + ca = f$	$x = \frac{f - 8888 - b888 - c8}{4888 + 3888 + c}$	$a = \frac{f + 38888 - 2b888}{4888 + 3888 + c}$
31	$aaaa + baaa - ca = f$	$x = \frac{f - 8888 - b888 + c8}{4888 + 3b88 - c}$	$a = \frac{f + 3888 + 2b888}{4888 + 3b88 - c}$
32	$aaaa - baaa - ca = f$	$x = \frac{f - 8888 + b888 + c8}{4888 - 3888 - c}$	$a = \frac{f + 38888 - 2b888}{4888 - 3888 - c}$
33	$aaaa - baaa + ca = f$	$x = \frac{f - 8888 + b888 - c8}{4888 + c - 3b88}$	$a = \frac{f + 38888 - 2b888}{4888 + c - 3b88}$
34	$-aaaa + baaa + ca = f$	$x = \frac{f + 8888 - b888 - c8}{3888 + c - 4888}$	$a = \frac{f + 2b888 - 38888}{3888 + c - 4888}$

35	$-aaaa + baaa - ca = f$	$x = \frac{f + 8888 + cg - b888}{3b88 - 4888 - c}$	$a = \frac{f + 2b888 - 3888}{3b88 - 4888 - c}$
36	$-aaaa - baaa + ca = f$	$x = \frac{f + 8888 + b888 - cg}{c - 4888 - 3b88}$	$a = \frac{f - 38888 - 2b88}{c - 4888 - 3b88}$
37	$aaaa + baaa = f$	$x = \frac{f - 8888 - b888}{4888 + 3b88}$	$a = \frac{f + 38888 + 2b88}{4888 + 3b88}$
38	$aaaa - baaa = f$	$x = \frac{f + b888 - 8888}{4888 - 3b88}$	$a = \frac{f + 38888 - 2b88}{4888 - 3b88}$
39	$-aaaa + baaa = f$	$x = \frac{f + 8888 - b888}{3b88 - 4888}$	$a = \frac{f + 2b888 - 3888}{3b88 - 4888}$
40	$aaaa + baa = f$	$x = \frac{f - 8888 - b88}{4888 + 2b8}$	$a = \frac{f + 38888 + b88}{4888 + 2b8}$
41	$aaaa - baa = f$	$x = \frac{f - 8888 + b88}{4888 - 2b8}$	$a = \frac{f + 38888 - b88}{4888 - 2b8}$
42	$-aaaa + baa = f$	$x = \frac{f + 8888 - b88}{2b8 - 4888}$	$a = \frac{f + b88 - 38888}{2b8 - 4888}$
43	$aaaa + ba = f$	$x = \frac{f - 8888 - b88}{4888 + b}$	$a = \frac{f + 38888}{4888 + b}$
44	$aaaa - ba = f$	$x = \frac{f - 8888 + b88}{4888 - b}$	$a = \frac{f + 38888}{4888 - b}$
45	$-aaaa + ba = f$	$x = \frac{f + 8888 - b88}{b - 4888}$	$a = \frac{f - 38888}{b - 4888}$
46	$aaaa = f$	$x = \frac{f - 8888}{4888}$	$a = \frac{f + 38888}{4888}$

# Canon pro potestate Quinta.

ggggg  
bgggg  
cggg  
dgg  
fg

ggggg  
4bggg  
3cgg  
2dg  
f

x

# Canon pro potestate Sexta.

gggggg  
bggggg  
cgggg  
dggg  
fgg  
hg

6ggggg  
5bgggg  
4cggg  
3dgg  
2fg  
h

x

Canon

[illegible]

Canon pro potestate Decretum

## Canon pro potestate Octava.

[illegible]



# Canon pro potestate Nonia.

gggggggggg	9ggggggggg	}	x
bggggggggg	8bgggggggg		
cggggggggg	7cgggggggg		
dggggggggg	6dgggggggg		
fggggggggg	5fgggggggg		
hggggggggg	4hggggggg		
kggggggggg	3kggggggg		
lggggggggg	2lgggggggg	}	
mggggggggg	mggggggggg		

## Canon pro potestate Decima.

gggggggggg	10ggggggggg	}	x
bggggggggg	9bgggggggg		
cggggggggg	8cgggggggg		
dggggggggg	7dgggggggg		
fggggggggg	6fgggggggg		
hggggggggg	5hggggggg		
kggggggggg	4kggggggg		
lggggggggg	3lgggggggg	}	
mggggggggg	2mgggggggg		
nggggggggg	nggggggggg	}	

F I N I S.



1	+	+	+	+
2	+	+	+	+
3	+	+	-	-
4	+	-	+	+
5	+	-	-	+
6	+	-	-	-
7	+	+	+	+
8	-	+	+	+
9	-	+	+	+
10	-	+	+	+
11	-	+	+	+
12	-	+	+	+
13	-	+	+	+
14	-	+	+	+
15	-	+	+	+
16	+	+	+	+
17	+	+	+	+
18	+	+	+	+
19	+	+	+	+
20	+	+	+	+
21	+	+	+	+
22	+	+	+	+
23	+	+	+	+
24	+	+	+	+
25	+	+	+	+
26	+	+	+	+
27	+	+	+	+
28	+	+	+	+
29	+	+	+	+
30	+	+	+	+
31	+	+	+	+
32	+	+	+	+
33	+	+	+	+
34	+	+	+	+
35	+	+	+	+
36	+	+	+	+
37	+	+	+	+
38	+	+	+	+
39	+	+	+	+
40	+	+	+	+
41	+	+	+	+
42	+	+	+	+
43	+	+	+	+
44	+	+	+	+
45	+	+	+	+
46	+	+	+	+
47	+	+	+	+
48	+	+	+	+
49	+	+	+	+
50	+	+	+	+

8	+	+	+
10	+	+	-
9	+	-	+
11	+	-	-
12	-	+	+
14	-	+	-
13	-	-	+
2	+	+	+
3	+	+	-
4	-	+	+
5	+	+	+
6	+	+	+
7	-	+	+
1	+	+	+

1	+	+
2	+	-
3	-	+
4	+	+
5	+	+

1	+
2	-